Home Computing WEEKLY

NEW

An Argus Specialist Publication

No. 1 March 8-14, 1983 35p

PLOT TO KILL DRAGON

Colour Genie boss Alan Whitford is just back from talks in Hong Kong on how to slay the Dragon.

His problem is that, at £199 for 32K of RAM, the Welsh-made Dragon 32 has twice the memory of the standard Colour Genie, priced at £224, although his company, Lowe Electronics, says the Genie has far more features.

There is, however, a higher priced 32K Colour Genie, or 16K can be added internally for about £39.

The answer Mr Whitford brought back from makers EACA was: we can add more memory as standard if more Colour Genies are sold, so bringing down production costs.

Since the November launch, 2,500 Colour Genies have been purchased and a £150,000 advertising campaign begins in June with a new advertising agency, chosen from a list of 18.

Mr Whitford, who will now be holding talks with his fellow directors, faces a second difficulty — the increasing value of the Yen is making imports more costly.

He said: "It may be done in two stages. We can add 16K as standard now without any other changes. Going to 48K or even 64K would mean a redesign job and would be a MkII version.

"I'm a little worried that this might not happen for two to three months."

Mr Whitford visits Hong Kong every year, along with distributors from Germany, Spain, Sweden and Italy. As well as three lengthy meetings, they attended a spring banquet with EACA's 1,000 employees to mark the Chinese New Year.

He brought back with him samples of two plug-in games

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Profile of software house

Trouble for computer ads

Complaints about advertising claims by three home computer companies have been upheld.

All three, Sinclair, Dragon and Acorn made amendments, says the Advertising Standards Authority.

Two people objected to an advertisment for the Sinclair ZX81 which showed three cassettes but failed to point out that a 16K RAM memory expansion was needed to run them.

Another complaint was about the phrase: "All you need... is a portable cassette recorder." Several makes of recorder are not compatible with the ZX81. Sinclair said it did not claim all recorders could be used and that it would supply a list of those which did work if a customer requested it.

One complainant wrote in about a claim that the Dragon 32, with 32K was twice as powerful as its competitors and included the 16K Spectrum in a comparison.

Dragon told the ASA that at the time they understood the 48K Spectrum was not readily available so it could not be compared.

The complaint faced by Acorn was about a brochure for its Atom which said any UHF TV set could be used. Acorn agreed some TV sets were incompatible.

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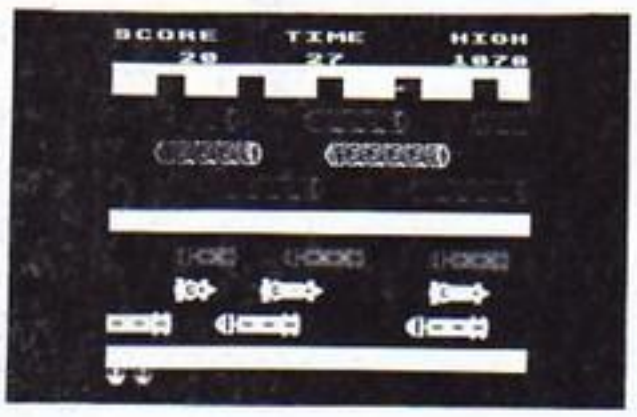
Spectrum cassette £5.75p

PLANES — BBC 32K

Spectacularly fast arcade style game Options for different speed of game — even the slowest is fast! Many different screens and bonus scores. Graphics are really superb.

Cassette £8.00 Disc £11.50



FROGGER — BBC & SPECTRUM

More arcade action for the BBC (as photo) and Spectrum. Get your frog across the road, use the logs to navigate the river and get home. Beware the crocdile and snake, collecting the lady frog gains valuable bonus points. Beat the time limit or die.

BBC cassette £8.00 Disc £11.50
Spectrum cassette £5.75

ORIC Two adventure games for the ORIC available NOW, Death Satellite and Zodiac. Both will run on the 16K machine. Cassettes at **£6.90** per game.

DRAGON Dead wood Monopilise a western town — (1-4 players), set your own time limit. Cassette **£6.90**. **Buccaneers** A piratical game again for 1-4 players. Cassette **£6.90**

ATOM Space Panic **£6.90**, Death Satellite **£6.90**, Zodiac **£6.90**, Cyclon Attack **£6.90**. Atom Utilikits still available from stock at **£18.50**

SPECTRUM Crazy Balloons, an excellent game for the 16K machine at **£5.75**. Specific, stock control/data management system for the 48K machine **£10.00**

BBC Pharaoh's Tomb, an interactive graphic adventure game for the Model B. Cassette **£8.00** Disc **£11.50**

Tower of Alos Another graphic adventure game — this will run on the A or B machine. Cassette **£6.90** Disc **£11.50**

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Home Computing WEEKLY

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IN BRIEF

Arcade game fans ignore the software they don't know, even though it may be better.

That's the experience of Ian Sinclair, managing director of Blackpool-based IJK Software.

He said: "We've done arcade games like space invaders and Atlantis and Beebmunch and they sell like hot cakes. People will buy them without seeing them.

"Some we have made which are better are just not bought because they have never seen them in the arcade parlours."

IJK Software, 9 King Street, Blackpool.

• • •

Salamander Software, a Brighton-based partnership of six graduates, is working on a series of programs for the Oric-1.

Until now the group has specialised in software for the Dragon.

Oric Products has commissioned software for its micro and Salamander is working on backgammon, an Othello-type game, a utility programme, a collection of four games, Trek, graphics, maze, and the first in a series of adventures.

Salamander Software, 17 Norfolk Road, Brighton, East Sussex. BN1 4AA

• • •

Software author John Diggle, who appears as a chef at computer shows, is bringing out two more programs in his Diggle's Kitchen range.

Running on the VIC-20 and ZX81, and later the Jupiter Ace, they are priced at £4.99 and cover Chinese and Indian meals.

Micro Computer Software, Unit 06, Pear Industrial Estate, Stockport Road, Lower Bredbury, Stockport. SK6 2BP

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Continued from Front Cover

cartridges — Genie Invaders and Fire Bird — due on sale here in about six weeks, with more to follow.

Coming soon is another cartridge for enhanced graphics and diagnostics which will be priced at £20-£30. Cartridges for 16K of extra RAM and for the Forth language are also on the way at similar prices.

They also discussed disc drives — EACA has three already designed. Mr Whitford is thinking of importing, at a "competitive" price", a slimline model with one 5¼in single-sided floppy drive with space inside to add a second.

One of his meetings was on future Genie models.

They discussed a £99 computer, aimed at the Spectrum market and compatible with present Genie software. All agreed it should have a typewriter-style keyboard like existing Genies.

EACA now produces its own keyboards, so there should be no question of paying extra to buy them in from sub contractors as other makers are often forced to do.

The low-price computer would appear on the market at the end of this year or early 1984, probably with 48K of RAM as memory prices will then have dropped further.

Mr Whitford, who emphasised that no-one should delay buying a computer because of the promise of future models, said: "To stay ahead in this business you must be thinking of new models even before the first has been launched. The next generation of computers will see us offering more for less."

He said it was ironic that one survey showed there were 35 games available for the Dragon, but the fact that there were 45 programs on sale for the Colour Genie had gone unpublished.

Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE

PERSOFT

PERIPHERALS AND SOFTWARE

HOME ACCOUNTS

An accounts program specifically designed for the home user. It contains many features which make it the best accounts package currently available for the BBC Microcomputer.
Home Accounts is a comprehensive program allowing total control of all data. Full documentation is supplied making it easy to learn and simple to use.
Available for the Model 'B' Micro only.

PRICE: £12.50

FRENZY

The object of this game is to destroy as many obstacles as possible. You are in control of a land speeder in an alien city. 'Running over' various objects such as dogs, fire hydrants and people. Your speeder has no brakes and you must dodge anti-matter blocks. Fast reactions and skill are required as your vehicle gets faster and faster.
For Model 'A' or 'B' Micro.

PRICE: £5.75

POTENTIOMETER JOYSTICKS

Single or twin joystick units for direct connection to Model 'B'. Allows true analogue movement via one or two high quality dual axis potentiometer driven joysticks. The unit is encased in an elegant injection moulded case with two push buttons for use with Adval (O) statement.
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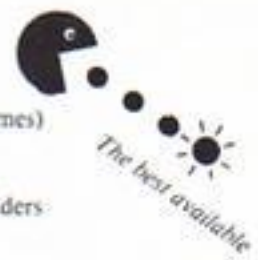

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ASTEROIDS

A classic version of the clasic game. Feature packed with thrust, hyperspace, rotate, multiple bolts, etc. This exciting program is written in m/c and employs hi-res graphics and double size screen techniques for maximum effect.

ASTRO SLED

Pilot your high powered sled down the jagged space canyon, but be warned - the further you travel, the harder it gets! With over 50 skill levels -

INVADERS

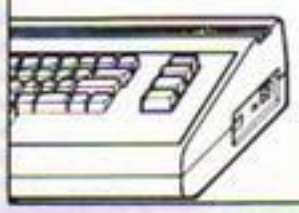
No machine is complete without this, the original cosmic shootout. In machine code with three invader types (plus mother ship), bonus bases, hi-res, double size screen, etc.

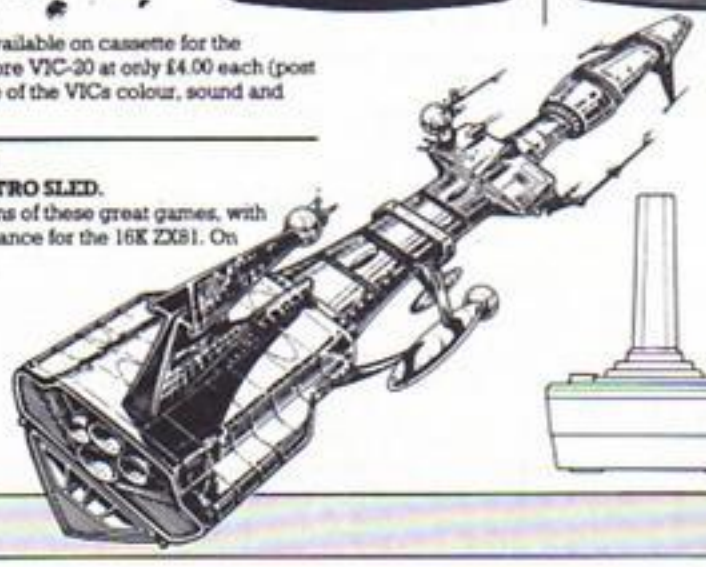
SPACE FIGHTER

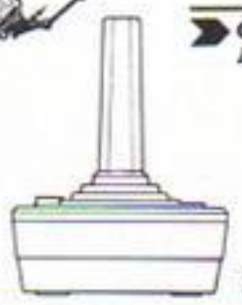
A space dog-fight simulator which, like Asteroids, is written in machine code and uses hi res. Guide your fighter through tight loops and turns to centre the elusive alien craft in your sights.
With 10 skill levels.

All the programs are available on cassette for the unexpanded Commodore VIC-20 at only £4.00 each (post free), and make full use of the VICs colour, sound and joystick facilities.

ZX81 SOFTWARE
SPACE FIGHTER, ASTRO SLED.
Feature packed versions of these great games, with machine code performance for the 16K ZX81. On cassette at **£3.50**







Please state **ZX81** or **VIC-20** and mention this magazine when ordering.

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Dial a new network

Micronet 800 is out to turn home computers into fully-fledged communications consoles for prices starting at just £49. But most home users will have to wait several weeks.

At the launch acoustic couplers were available only for the BBC micro with the Spectrum due on May 1 and ZX81, Dragon and VIC-20 available on July 1.

Kenny Everett stars in a promotional video tape, fooling around as Bob Denton, one of Micronet's founders, plays it straight to describe the service. There are also T-shirts bearing the words: "On your byte..."

Subscribers get access, via their phones, to up to 100 free programs, bulletin boards, buyers' guides, software demonstrations, user group and computer news, prize games and all Prestel's pages.

There is also the chance to buy off the screen — with the price added to the phone bill.

Acornsoft is offering some of its smaller and more specialised programs at cut rates and its catalogue can be ordered through a response frame.

Micronet 800, a £1m project, has 30,000 pages on its mainframe computer, reached through Prestel. It is being set up by a publishing group, British Telecom's Prestel staff and high street distributors Prism Microproducts.

Micronet has signed a seven-year deal with Prestel and is planning for 20,000 subscribers in the first year, 50,000 by the end of the second and a total of 100,000 in three years.

Managing director Richard Hease said: "The market for this service is enormous. Our market studies show that there is already a base of some one million personal computers in Britain today. By 1986 we expect this base to be three million."

The joining fee registers the user and buys an acoustic coupler and lead, software, instructions and directory and registration by Prestel which will supply a password.

The £1 weekly subscription is included in the phone bill but there is no computer charge between 6pm and 8am on weekdays and all day at weekends.

Kenny Everett — it can't be... yes, it's a computer

Richard Hease — Micronet's managing director

Outside these hours the charge is 5p a minute.

Micronet says it is within the range of a local phone call for 65 per cent of the country and that this would rise to 92 per cent by the end of the year.

There are special deals for schools, dealers and businesses.

The first 10,000 subscribers will pay a reduced rate — £49 for the BBC micro and £54 for the Spectrum. Micronet is first aiming to appeal to schools — with special features for education — and to home users.

Business Micronet is planned for September launch with access to mailbox and Telex facilities. Business software will be available for downloading and the National Computing Centre is working on the problem of avoiding piracy.

Micronet is planning to develop a new adaptor every month, with some independent companies providing them too, until a wide range of microcomputers can link into the system.

Part of the cost of Micronet is being met by a Department of Industry grant and junior minister John Butcher was at the launch conference.

Micronet 800, Bushfield House, Orton Centre, Peterborough PE2 0UW

Micro show goes quietly

Just a mile away from the busy ZX Microfair, another, quieter, computer exhibition was being held.

Sandwich board men were out on the streets of Westminster to advertise the Commodore show at the Central Hall on Saturday last week.

Organised by Commodore Computing magazine, it offered the chance to see products by a dozen or so software houses, book publishers and add-on makers.

Among the products was a new micro-disc, but the emphasis was on software.

Llamasoft was showing some of the first software for the Commodore 64. However, most exhibitors were showing VIC-20 programs.

The show was staged just a week after Commodore's own series of exhibitions at its dealers.

Llamasoft, Lindon House, The Green, Tadley, Basingstoke, Hants.

So you think you can write?

Prove it to me and you may be able to join our team of contributors. We are looking for:

- **Articles on using home computers. You must be able to give specific examples, if necessary with programs. Have you discovered a new aspect or a new way of using a known feature? Your ideas are what we want.**
- **Program reviews. We need to test all forms of software — household and educational as well as games**
- **Tests of hardware and add-ons. For these you have to have a good knowledge of computers and peripherals**

If you feel you can meet our standards, write to me (don't phone). Please name your micro, plus memory, give your occupation or training and, if under 21, your age. Include a daytime and home phone number if you can.

We always test the writing ability of new contributors.

Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE.

Virgin's £1m programs project

Virgin, the record company which grew to an empire in just 10 years, is spending £1m to get into the computer software business.

It has set up Virgin Games and expects to have its first five-ten cassettes on sale by June.

Nick Alexander, 27, has been recruited from Thorn EMI Video Programmes to head the new company.

He is expecting to spend £1m in the first year and to reach a turnover of £1m, half from exports.

"The timing is quite good," he said. "We have to move quite rapidly now, but the market has got to the size that Virgin marketing can come into play."

He said there were three-quarters of a million home computers in Britain — four per cent of homes had one — and soon the computer software market would be bigger than the market for video cassettes.

Virgin Games is just three people working out of offices in London's Portobello Road: Mr Alexander, marketing man Hugh Band and administrative assistant Angela Fitzgerald.

They plan to have up to a dozen games on sale by the end of the year in Virgins chain of record shops, retail store chains and specialist shops.

Mr Alexander said: "Virgin see it as being a growing market and one which has a long-term future, otherwise we would have gone in for video games which — if you want to make a fast buck — would be the way to go. It's a serious expansion for us.

"As in all markets, the people who are good enough will survive. There are more than 300 small software houses in the UK and not all of them will last."

Mr Alexander said he was approaching some of the smaller software houses for potential products; he wanted about 1,000 programs from which to choose.

And he added: "I have enormous respect for companies like Quicksilva and we are looking for programs that are as good as their."

Quicksilva director Mark Eyles said: "If I were in their position I would have done it before now. It doesn't surprise me.

"What they are talking of doing we are already doing, although they are a bigger organisation. They will be following us.

"I don't think it's going to hurt us. It will hit some of the medium-sized companies, but not people like us."

Virgin was first set up by Richard Branson as a discount record shop. Now the group includes 30 stores — several are franchises — recording studios, book publishing and video cassettes. Mr Branson, who is keen on arcade games, is now a millionaire.

The record industry is in a decline and not expected to hit a peak like the 70s again. But the computer software market is estimated to be worth £100m a year.

Virgin Games, 61/63 Portobello Road, London. W11

Nick Alexander — moving into computer games

Free offer: your time and trouble

People often ask just how much the micro market has changed over the four or so years that I have been involved in writing about it. In terms of hardware and the price you pay for it the market has changed dramatically.

We've progressed from about half a dozen machines, mainly American, which had very little support. And the only way anyone got to know anything about them was by buying one and having a go. As a result we now possess a vast resource of information on many machines, very active user groups and a lively and progressive magazine and book market. But, all is not roses...

In the desperate scramble to get a new machine onto the market ahead of its rivals or to promote a new software, many companies are cutting corners.

As a result we are beginning to see a crop of new machines which simply aren't all they are cracked up to be.

We now have a machine, recently introduced by a British company that should have known better with its past experiences, which arrived a month or so late without a proper manual and without some of the necessary leads. These are now being distributed some two months later and there are still errors in the documentation despite two sets of errata sheets!

In another instance there is a computer that showed exceptional promise but couldn't do certain arithmetic calculations and appeared to be missing certain advertised routines to handle printers and the like. This machine is still on sale even though the company that makes it is well aware of the problems.

How, you might ask, do we find out all these things? Well, the answer is simple. When we decide to review a machine we don't just look at the box and run the demonstration tape. Neither do we take an early version of a machine which might be later modified before full production commences. Our reviews are carried out on the same machine as you will pay your cash for and requires somewhere between three and four weeks of use — not just a quick weekend bash.

In other words, just as you would expect a reviewer of a film to watch it all the way through we try out as many tests and routines as practicable.

The question is: Why don't the manufacturers take the same sort of trouble? Well, in the bigger companies they do, although even the IBM Personal Computer had a few bugs. The smaller concerns, which are generally producing the more interesting and innovative products, can often simply not afford to invest large sums of money in quality control. Much of their manufacture will already be sub-contracted, the design team may even be working in somebody's garage and the software author could still be at college.

So is it any wonder that faults creep in?

What the industry needs is a code of practice to cover the occasions where, when bugs of a serious nature are found, the manufacturers appear to do nothing about it.

Still, there may be one small compensation for you, the user. I reckon you are entitled to describe yourself as a freelance software and hardware engineer. The emphasis is on the free...

Henry Budgett
Editor of Computing Today

● What makes you angry — delighted — about the micro market, hardware or software? We welcome contributions for this weekly column. Send them to: Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

I.J.K.'s RANGE OF QUALITY SOFTWARE CONTINUES TO EXPAND...

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Cassette 1: Star Trek/Candy Floss (very popular) **£6.50**
Cassette 2: Family Games (hours of fun) **£4.50**
Cassette 3: Mutant Invaders/Breakout **£6.50**
Cassette 8: Model A Invaders (M/C) **£5.50**

➡ MODEL B (or A+32K)
Cassette 4: Beeb-Beep (Super Simon Game) **£4.50**
Cassette 5: Beebmunch (full colour Munchman) **£6.50**
Cassette 6: Super Hangman (animated, educational) **£4.50**
Cassette 7: 3D Maze (fast and intricate) **£4.50**
Cassette 12: Flags (Countries and Capitals) **£4.50**

➡ CASSETTE 9
Contains model B Invaders. A superb feature adaptation of the arcade 'Space Invaders' game in machine code and hi-resolution colour graphics for the BBC Micro model B (or A+32K). Play normal game or choose from the many options including Missile, Bomb and Invader speeds. Invisible Visible and Shields no Shields. Quite simply the best.
Only £7.50 for MODEL B (or A+32K)

➡ CASSETTE 10
WORDPRO. Cassette based word processor for either Epson or Seikosha printers. Features right hand justification, alter, insert, delete, pages to tape, printer mode changes from within text line etc., etc. Complete with manual.
Only £10.50 inc. **for MODEL B (or A+32K)**

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➡ CASSETTE 11
ATLANTIS. The superb fast action arcade game written in machine code to illustrate to the full the machines fantastic colour graphics and capabilities. This game includes all the usual ATLANTIS/ SCRAMBLE features. Guide your submarine Nautilus along the undersea landscape and through the caverns avoiding mines, depth charges, rockets, jelly fish, serpants etc.
Only £7.50 inc. **For MODEL B (or A+32K)**

➡ CASSETTE 13 – HYPERDRIVE
A new, very addictive machine code arcade game. Guide your laser tanks around the network of passages destroying the drone Aliens – but beware, evil OTTO lies in wait!
Only £6.50 inc. **For MODEL B (or A+32K)**

➡ CASSETTE 14 – STRATOBOMBER
Another new highly colourful machine code arcade game. Can you keep the enemy fleet at bay long enought to destroy the nuclear reactor of the rogue Star Ship before it destroys your home planet? Superb graphics.
Only £7.50 **For MODEL B (or A+32K)**

NEW CASSETTE 15 – LEAP FROG
The fabulous 'frogger' arcade game reaches the BBC micro. Superbly written full colour machine code version for the Model B (or A+32K). Help the frog cross the road avoiding the vehicles travelling at different speeds, and cross the multi current river to reach the safety of the lilly pads. The game gets progressively harder – perfect for arcade addicts.
Only £7.50 for MODEL B (or A+32K)

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ZX Microfair: Find out what you missed

We scoured the ZX Microfair to bring you the first details of the best of the new products.

Paul Liptrot reports

Queues stretched along the street four deep as Mike Johnson staged his sixth and most successful ZX Microfair last weekend.

Nearly 8,000 visitors packed the New Horticultural Hall, Victoria, and afterwards Mike, 39, began planning his next show for two days in mid-May.

Mike and a team of friends held their first exhibition in September 1981 and then people queued in the rain for two hours. Mike said: "I felt sorry for them, but they were as keen as mustard."

Nearly 100 exhibitors took space last Saturday, all doing brisk business.

Mike, an executive officer with the Department of Employment, said: "If it keeps on going like this and would generate enough money to support me full-time I would do it.

"There's a lot of money passing through my hands, but after I've paid for the hall, the advertising and the odds and ends there's not a lot left in terms of a business.

"I've got a secure job at the moment and this is not the most secure business in the world. Of course, I'd like to do it full-time — I like computers and I like computer people."

Many exhibitors were showing brand new products.

This is Home Computing Weekly's exclusive selection:

Softek had four new Spectrum games at £5.95 — Monsters from Hell, Millipede, Fire Bird and Cosmic Storm. And coming soon: a three-dimensional maze adventure called Dragon's Lair and Joust, an arcade game.

John Suter, of Axis, has written Labyrinth, a challenge game with randomly-created mazes, for the 16K Spectrum at £5.95.

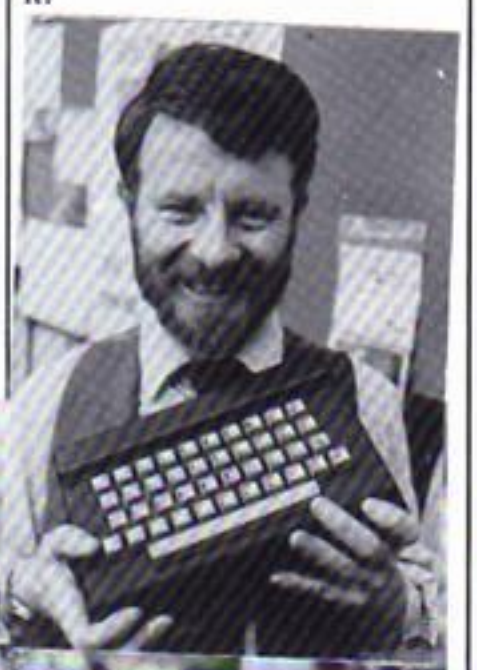
Camel Products launched two EPROM programmers for the ZX81. Bloprom-81, the more sophisticated version, costs £79.95 with a free blank and Promer-81 is the low-cost model at £19.95. A no-frills 16K RAM card for the ZX81 was introduced at £17.35.

dK'Tronics had a new light pen for the Spectrum at £19.95 — and sold all 200 of them in three hours, to the delight of marketing director Peter Brownlie.

Computer-printed wall posters around the hall warned: "Certain uses of Spectrum-Zap could infringe the Copyright Act." Terry Bartlett, who was marketing the MkII version, says it will make back-up copies of your software and copy them on to one cassette if you wish.

Ab Pandaal, managing director of Kempston Micro Electronics, showed a new Centronics interface for the Spectrum costing £45, including cable and software. A word processor at £5 for the Spectrum is due out in two weeks.

Cobra Technology was demonstrating its £30 communications package for the ZX81 by dialling up British Telecom Gold. Technical director Ken Waddon said: "We are selling them faster than we can make them. A lot of people have heard of electronic mail and now everyone can afford it."



Smiling success — show organiser Mike Johnston. Inset: Bob Karlson with a wooden mock-up of a ZX81 and Spectrum Keyboard, out soon from Kayde at £45

A new input/output port for the Jupiter Ace was shown by Haven Hardware. It costs £14.95 as a kit or £19.95 ready-built.

Nigel Stuart, a 16-year-old Manchester schoolboy, has written two cassettes for the 48K Spectrum. They are Devil Birds and Digger Man, £3.95 for the pair, and ET/Seekey, at £4.95 for the two in the 48K version, or £3.95 for the 16K version. Macronics Systems is marketing them. Managing director Ken Macdonald said his first Commodore 64 game would be out in about six weeks.

Kayde Electronic Systems had a wooden mock-up of its £45 keyboard, which includes a space bar, for the Spectrum and for the ZX81. Bob Karlson said the keyboard, ready at the end of the month, could be fitted in 10 minutes.

Three new games at £5.95 for the 16K Spectrum were shown by Silversoft — Cyber Rats, Muncher and Slippery.

Memotech's keyboard for the ZX81 comes in a choice of three colours: blue, black or white. It costs £49.95, plus £2 by mail order, and has a cable with a plug that simply fits into the port.

Micromega's new games, written by Tony Poulter, are Arcade Action, £4.95 for five machine code games running on the 1K ZX81.

Cashcalc, a cashflow planner for the home, costs £6.95 for the Spectrum and is being marketed by Data-Assette for Wizard Supersoft.

Elfin Software, a partnership of Kevin Baker and Gordon Green, was exhibiting its first product, Tobor, a space strategy game in machine code for the 48K Spectrum. Its second, Jawz at £6.95 and for the 16K Spectrum, is due in a week or two. It is an arcade game in which the player must fire proton spears at seven deadly sharks.

A GP whose pastime is bird-watching, Dr Dennis Parker, wrote Garden Birds, a new program for the 48K Spectrum at

£6.50 from Hilton Computer Services. By typing in details it will identify scores of birds, with colour and sound and, if necessary, a print-out. Hilton's Personal Banking System, at £8.95 for the 16K ZX81, and £9.95 for the 48K Spectrum, Dragon and BBC micro, will soon be available for the Lynx and Oric-1 at about the same price. A Bank Reconciliation program, for the same models of ZX81, Spectrum and Dragon, is just out for £5. They can be bought together at £14 for the ZX81 and £15 for the Spectrum.

A high-resolution graphics board for the ZX81, costing £38.95, fits between the computer and uses 6½K and has its own 2K EPROM to give a fully programmable 256 by 192 resolution on screen, says Digital Integration.

Retrace the course of evolution on a 48K Spectrum. The first time round it took 3,000 million years from primordial soup to man. Microsphere, whose £6.95 tape is out this week, says: "Can you do it quicker?" It includes graphics, sound effects, on-screen commentary and scoring. David and Helen Reidy, the husband and wife team who run Microsphere, also showed ZX-Sideprint, at £4.95 for ZX81 and Spectrum, which prints sideways on the ZX Printer, and Omnicalc, at spreadsheet program for the 48K Spectrum at £9.95.

AGF Hardware brought out its Joystick Interface Module 2, at £19.95 for the Spectrum, ZX81 and Jupiter Ace, and says it will work with most joysticks and simulate cursor key controls.

Your Spectrum can sound like an electric organ says PDQ which has launched Spectsound, at £5.95 for either Spectrum. Building surveyor John Weston, who runs the firm with his wife Deborah, said Spectsound reproduces nine octaves and can store 200 notes.

Marital discord is the theme of Mad Martha, a new adventure graphics game at £6.95 for the 48K Spectrum from Mikrogen. It features a husband who rebels against his loutish wife. The company also launched two £5.95 arcade games, Space Zombies and Cosmic Raider, for the 16K Spectrum and three more space games are due early next month.

Amba Software had a £9.80 cassette for the 48K Spectrum called Triad — three games on one tape: Snackman, Sub Track and Treasure Hunt.

Ricky Caplan was showing a low-price ZX81 console, costing just £3.99, which will house the computer, power supply and RAM pack and could be adapted for add-ons. When not in use the ZX81 slides away inside.

University Software had five tapes, for both Spectrums, designed for students. They are Matrix Operations, Polynomials and Integration, all at £6.95 each, and Regression and Linear Programming, for £7.95 each.

Richard and Elaine Shepherd were showing for the first time their new game, Everest Ascent, which costs £6.50 and runs on the 48K Spectrum.

James Greenall, proprietor of Jaysoft, was exhibiting two "serious" Spectrum programs — Compufile, at £4.95, which can be used as an address book, diary, catalogue and so on, and the Personal Accounting Utilities Ledger, or PAUL, which, for £12.95, will run a household budget.

Masterfile-16, a new version designed for the 16K Spectrum, was launched at £12 by Campbell Systems. Written in machine code, the Company says it can be used at home or at work.

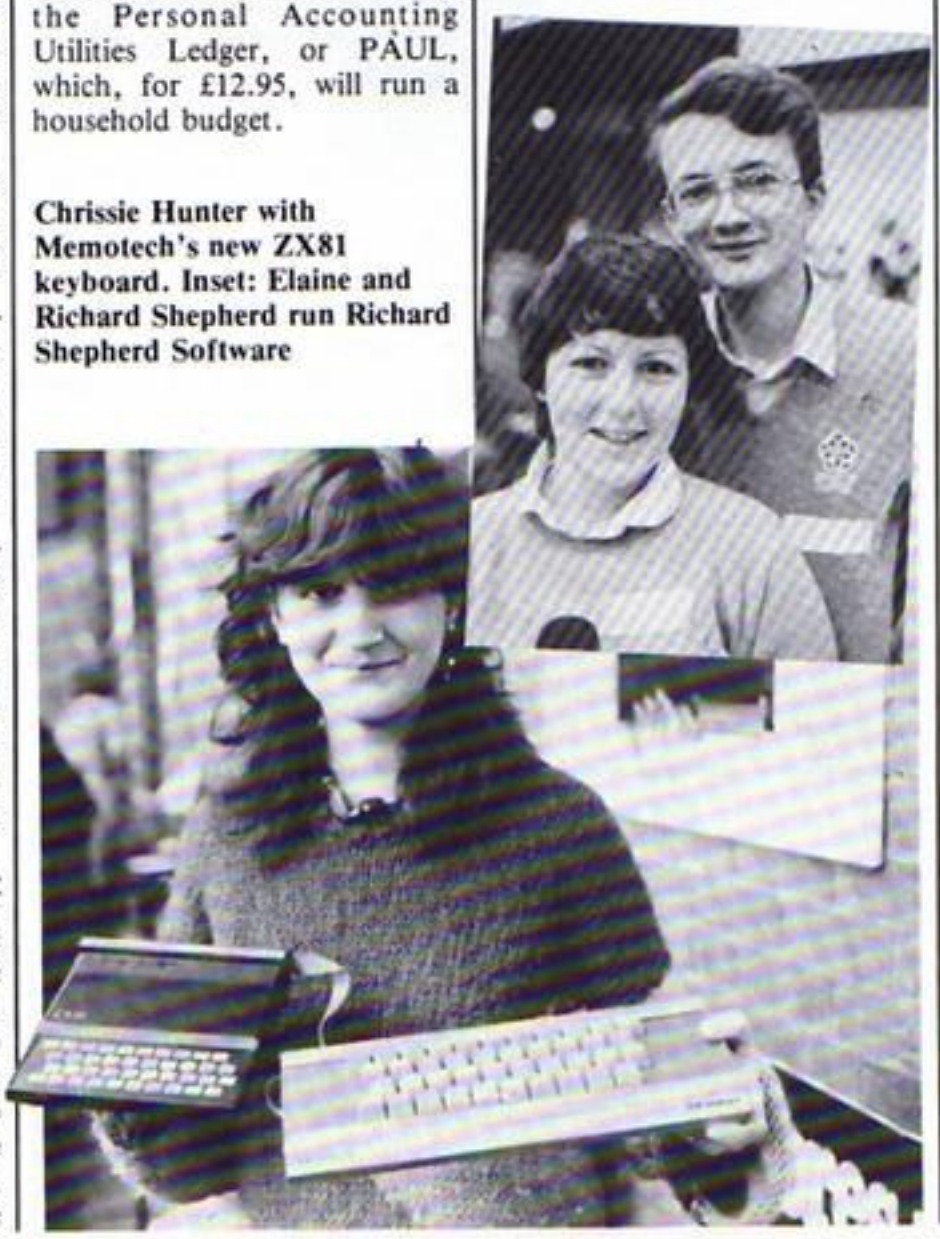
Hilderbay was selling a £45 printer Centronics-type parallel printer interface for the 48K Spectrum, including printer cable and a free word processor.

Volcanic Dungeon, a £5 adventure from Carnell Software, offers the chance to win a holiday for two in Florida. It is available for the 16K ZX81, 48K Spectrum and the Dragon.

Superchess II, costing £7.95 for the 48K Spectrum, was shown by CP Software.

Micro Marketing launched a range of £4.50 games — Acevaders, Dotman, Swampmonsters and Jupiter Says — for the Jupiter Ace along with Ace Pacer, an expandable RAM pack at £35, plus a 16K module at £19.95, also for the Ace.

The big software houses, like Quicksilva and Abbex, were also at the show.



Chrissie Hunter with Memotech's new ZX81 keyboard. Inset: Elaine and Richard Shepherd run Richard Shepherd Software

Where to find them

Softek, 329 Croxted Road, London SE24
Axis UK, 71 Brookfield Avenue, Loughborough, Leics LE11 3LN
Camel Products, 1 Milton Road, Cambridge CB4 1UY
dK'Tronics, 23 Sussex Road, Gorleston, Gt Yarmouth, Norfolk
Terry Bartlett, 3 Palace Gates Road, London N22
Kempston Micro Electronics, 180A Bedford Road, Kempston, Bedford MK42 8BL
Cobra Technology, 378 Caledonian Road, London N1 LDY
Haven Hardware, 4 Asby Road, Workington, Cumbria.
Macronics Systems, 26 Spiers Close, Knowle, Solihull, West Midlands.
Kayde Electronic System, The Conge, Great Yarmouth, Norfolk NR30 1PJ
Silversoft, 2 Hammersmith Broadway, London W6
Memotech, Station Lane, Witney, Oxon OX8 6BX
Micromega, 230-236 Lavender Hill, London SW11 1LE
Data-Assette, 44 Shrotton Street, London NW6
Elfin Software, Hudson House, Battery Road, Great Yarmouth NR30 3NN
Hilton Computer Services, 14 Avalon Road, Orpington, Kent BR6 9AX
Digital Integration, 22 Ash Church Road, Ash, Aldershot, Hants.
Microsphere, 72 Roseberry Road, London N10 2LA
AGF Hardware, 26 Van Gogh Place, Bognor Regis, West Sussex PO22 9BY
PDQ Software, Parsley Rye, Hilders Lane, Edenbridge, Kent TN8 6JU
Mikrogen, 24 Agar Crescent, Bracknell, Berks.
Amba Software, 13 Cherry Bounds Road, Girton, Cambridge CB3 0JT
R. Caplan, 87 Granville Park, Lewisham, London SE13 7DW
University Software, 45C Sloane Street, London SW1X 9LU
Shepherd Software, Freepost, Maidenhead, Berks SL6 5BY
Jaysoft, 6 Wentworth Drive, Bishops Stortford, Herts.
Campbell Systems, 15 Rous Road, Buckhurst Hill, Essex.
Hilderbay, 8/10 Parkway, Regents Park, London NW1 7AA
Carnell Software, 4 Staunton Road, Slough, Berks SL2 1NT
CP Software, 17 Orchard Lane, Prestwood, Great Missenden, Bucks.
Micro Marketing, 92-104, Carnwath Road, London SW6
Quicksilva, 92 Northam Road, Southampton, Hants.
Abbex, 20 Ashley Court, Great Northway, London NW4

Atari 1200XL — remembers to turn off the screen

Atari turns off the screen

This new Atari computer is due on sale in the next few weeks, offering 64K of RAM, four function keys — and a time switch for forgetful users which turns off the screen.

Product manager Graham Daudney, speaking at the company's new UK headquarters in Slough, said the 1200XL was not meant as a replacement for the 400 and 800 models.

He said it was more user friendly than Atari's present computers, with improved graphics, user-definable keys and a help key: press it and it displays a dignostic menu.

It would be software compatible with the 400 and the 800 and new programs were being written for it.

A price has not been announced, but in America the 1200XL costs 900 dollars.

Atari, Atari House, Railway Terrace, Slough, Berks. SL2 5BZ

Half-price micros soon

One in every 10 homes will have a computer by 1985, says a new survey. And by then prices will have halved.

Already three per cent of people over 14 in the UK own a micro, a total of 500,000.

The survey, which involved questioning 1,043 people, was carried out by Mintel Publications on computers costing less than £500.

The top six were, in order of machines sold: Sinclair Research, with 40 per cent of the market by value between 1980 and 1982, Commodore's VIC-20 (18 per cent), Acorn (nine per cent), followed by Atari, Dragon Data and Texas Instruments.

The value of the market is estimated by Mintel to be worth £90m-£100m, but its report warns that market shares can be changed quickly by new entrants.

Choose your Dragon discs

Disc drives for the Dragon will be on sale soon from three companies, including the makers of the micro.

Premier Microsystems' single drive costs £300 and is due this month and the double drive from Compusense, ready in three months, will be priced at £500-£600.

Dragon Data's own single drive is promised for next month at £250-£275 — see news item.

Premier is also selling its floppy disc controller separately at £100. About the size of a thick paperback, it plugs into the Dragon's cartridge socket to run 5¼in and 8in disc drives as well as the new micro-floppies.

The disc operating system appears as an extension of BASIC to the user and can include, as an option, Microsystems' Encoder 09, an assembler/disassembler and monitor.

The controller is told from the keyboard which discs are in use — number of tracks, number of sides and sectors per track can all be specified.

Capacity varies according to the drives in use, but a standard 5¼in 40-track disc would hold 90K and a double-sided 80-track 5¼in disc would offer 360K.

Four double-sided disc drives can be run by the controller, which means around 1.4 megabytes of data on 5¼in discs and more than 2 megabytes with 8in discs.

Premier's £300 all-in-one system comprises a single Canon 5¼in disc drive, power supply, cables and controller.

The firm says it expects more "serious" and business programs to be produced now the Dragon can run floppies. Its team is already working on some, including a word processor.

Premier also plans to bring out soon a mother board to allow several enhancements to be added to the Dragon.

Compusense's plug-in disc controller will also work with single, double or multiple disc drives. But it also includes 64K or extra RAM, as well as a ROM monitor, plus the industry standard RS-232 interface — "not available from any other source."

The company says there is 48K of extra memory once its Flex-09 operating system has been loaded from disc.

Its package includes two 5¼in drives for double-density, single-sided 40 track discs with a total capacity of 400K.

Ted Oprychal, of Compusense, said the drives from Premier and Dragon were "just a substitute for a cassette recorder" because the extended BASIC operating system did not offer a wide range of applications software.

He saw the Dragon having considerable potential for the business user and his unit, as well as offering extra memory, overcame the drawback of the Dragon's 32 by 16 display by allowing an 80 by 24 monitor to be connected via the interface.

A wide range of disc-based business software was already available on the Flex operating system.

Premier Microsystems, 208 Croydon Road, Anerley, London SE20 7YX

Compusense, P.O. Box 169, Palmers Green, London N14.

Four years ago

The Nascom 1 microcomputer kit, complete with 2K of RAM was £178.20 from Microdigital, of Liverpool. A 2K Tiny BASIC, which came in two EPROMs, was an extra £27... A duel drive minifloppy for the PET, with 100K per side, was priced at £916, plus eight per cent VAT. Initial supplies would be limited, warned an advertisement by Lotus sound, of London. Deliveries would begin in 10 months... Processor Technology's Sol 20/16 computer system, with 16K and a VDU, was £1,785. The Byte Shop, of Ilford, announced: "Over 7,000 sold!"

Micro show looks north

Experts will be on hand to give advice to micro buyers at our home computer show next month.

The Computer Advice Centre at the first Manchester Home Computer Show will have an area for visitors to try machines and examine programs covering education, games and small businesses.

The show is being staged by ASP Exhibitions, an arm of Home Computing Weekly's publishers Argus Specialist Publications, at the Midland Hotel on April 21, 22 and 23.

One lucky visitor will win two computers — one to take home and one for the school of the winner's choice — in a free competition. Entry forms are available with advance tickets and with the show guide on all three days.

Exhibitors will be showing a wide selection of hardware and software for the home user, with empahsis on computers in the £50-£400 price range.

Advance tickets are £1 from ASP Exhibitions. Free entracne for children under eight and pensioners and there is a 25 per cent discount on groups of 20 or more.

John Graham, Manchester Home Computer Show, ASP Exhibitions, 145 Charing Cross Road, London WC2H 0EE. 01-437 1002.

A NEW SERIES FOR FIRST TIME USERS

"Learning to Use" is a new series of books which introduces newcomers to the most widely used micros in the marketplace.

The books assume absolutely no knowledge about computers and the reader is shown even the most fundamental operations such as "switching on" and "loading a program". The books lead the reader through simple programming and then on to graphics, with several programs which show how to achieve pictures and even animation!

The user-friendly approach is consistent throughout the text – not only are program listings clearly shown, but in many cases, a photograph is included to show what the program looks like when actually loaded and run!

All books in the series are £5.95 (incl. postage). **Gower**

To be published April–June 1983

Learning to Use the Apple II/IIE Computer (April)
Learning to Use the Oric 1 Computer (April)
Learning to Use the Commodore 64 Computer (May)
Learning to Use the TI 99/4a Computer (May)
Learning to Use the Lynx Computer (June)

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- ☐ Learning to Use the TI 99/4a
- ☐ Learning to Use the Lynx

HCW1

Plug in a computer — the Entex 2000 Piggyback

Suddenly it's a computer

Turn your Atari video game player into a home computer for just under £100.

That's the offer from managing director Clyde Roberts, whose company, Hales, is importing the Entex 2000 Piggyback Computer from America.

It plugs into Atari's 2600 and 2600A games players and the colour and design are the same.

Mr Roberts, who reckons he's got a captive market of 750,000 here, said: "Half the marketing has been done for us. We are saying: 'Why spend hundreds of pounds to get your toe wet in computing?'

"We have heard that other machines which do the same are on the way, but we've yet to see them.

"I was at the Las Vegas consumer electronics show in November and no-one had one. We are going to be the first by about six months."

Mr Roberts, whose company is part of the £25m turnover Adam Leisure Group, expects his first imports — re-named for the UK — to be on dealers' shelves at the end of the next month.

It has 70 full-size keys, including nine function keys and four cursor keys, 8K of Microsoft-like BASIC, 3K of RAM, expandable with a 16K cartridge at £29.95, 32 by 16 character display and optional industry standard RS-232 interface. Software comes in cartridges at £19.95-£24.95.

Mr Roberts has got another marketing plan up his sleeve. His company markets Imagic cartridges for the Atari games players and many buyers belong to the Numb Thumb Club. They will get a mail shot telling them of the new product.

And he added: "We've got two more computers to come for later this year."

Hales, 33 Harrowbrook Road, Hinckley, Leics LE10 3DN

Spectrums everywhere

Sinclair ZX Spectrums, now being turned out at 50,000 a month, are now on sale in some branches of Boots, Currys, Greens and John Menzies, as well as W.H. Smith.

Other stores, including John Lewis, House of Fraser, Rank Xerox and smaller retailers, are being supplied by Sinclair's distributors.

By Easter the company — which recently announced it has sold its millionth computer — expects to be selling 12-15,000 Spectrums a week while the ZX81 is now selling 30,000 a month.

Sinclair Research, 25 Willis Road, Cambridge. CB1 2AQ

Miss print

Miss World — with a bit of an Epson printer.

Miss World has been signed up for two years by Epson to add some glamour to its products.

Mariasela Alvarez Lebron will be appearing in advertisements for Epson's printers and its small HX computer.

And Epson will also be taking part in the Miss World finals.

TI: Buy a second micro

Now, the two-computer family. Texas Instruments says its new £75 basic computer, designed for novices, could be the home's second micro.

TI announced two computers within four days — the other one is a £170 model for professionals and on sale by the end of the month.

The company says it believes that its basic model, the TI-99/2, is the first 16-bit computer at such a low price.

It would be available after October, along with low cost add-ons and software that will also work with the TI-99/4A.

The company says it believes that its basic model, the TI-99/2, is the first 16-bit computer at such a low price.

It would be available after October, along with low cost add-ons and software that will also work with the TI-99/4A.

TI's William Turner said: "The TI-99/2 will be targetted primarily at the technical enthusiast, engineer or student in the home.

"Additionally, we expect the computer to be purchased as the first computer in the home for those who are just beginning their experience with a computer system, or as a second computer..."

It has 48 rubber-like keys, 4K of user RAM — expandable to 36.2K — black and white display and a port at the back for TI's add-ons, including RS-232 interface, its Wafertape drive and printer/plotter.

Two software cartridges, Learn to Program and Learn to Program BASIC, will be on sale followed by more. And 20 cassettes will be available when the computer is launched here, including educational, household and games. They will also run on the TI-99/4A.

TI's Compact Computer 40 runs on batteries, has a 31-character liquid crystal display and occupies about the same space on a desk-top as a telephone.

Texas Instruments' TI-99/2 — cheapest 16-bit computer?

Mr Turner said it was aimed at white collar workers who needed a small personal computer and data communication. It has 32K of ROM, occupied by BASIC, 6K of user RAM, which can be expanded to 16K with plug-ins. It will run the same peripherals as the two other micros with more to come later in the year.

These include a bar code reader, modems, printer and a black and white TV interface. Twenty-two software packages — cartridges and Wafertapes — are promised by the end of March at £34.95-£125.95 and mainly for business. Another 53 are due by November.

The CC-40 measures 9½in by 5¼in by 1in, weighs 22 oz, has a QWERTY keyboard with numeric keypad, batteries for 200 hours and can run off the mains with a £15 adaptor.

Texas Instruments, Manton Lane, Bedford. MK41 7PA

TI Compact Computer 40 — first of a series of portables for professionals

SAVE YOURSELF £40 ON ORIGINAL PRICE BY SENDING NOW!!!

Do you own a computor? — Thinking of getting one? — or are you just interested in computors?
WHICHEVER CATEGORY YOU COME UNDER — **THIS OFFER IS FOR YOU**

DO YOU SINCERELY WANT TO BE RICH? WOULD YOU LIKE TO MAKE SOME REAL MONEY JUST WORKING WHEN YOU FEEL LIKE IT

It is a very TRUE saying—"More than half of the People in the World are Asleep"—it is the rest who make the **REAL MONEY**

Let me first of all tell you a little about myself. I am 52 years of age and I am placing this advertisement at a time that is near to my contemplated retirement. I wish retirement in order that I can find time to commence writing my second book, more of this later.

Are you unemployed?—maybe recently made redundant?—or are you just fed up with your work and need a change?—then why not **BECOME YOUR OWN BOSS** and start making some **REAL MONEY** for **YOURSELF**.

CHANGE YOUR WHOLE LIFESTYLE.

THIS WILL BE THE SUCCESS STORY, of not only 1983—**BUT OF ALL TIME**.

Let me tell you—it is not so very long ago that I was BROKE, yes completely and utterly BROKE. The Bank Manager would not even see me for a loan, let alone grant me one, and I was paying off my debts by small instalments to avoid Court Action for Recovery or even Bankruptcy.

We were renting a very small, very old house (since demolished) paying at that time 10/- weekly rent—this sum we had to literally 'scrape' together each week.

We did have (I say **did** have) an old 'banger' of a car, for which I had originally paid £140 on Hire Purchase.

One day along came the Hire Purchase Company Representative to repossess the car—as I then owed them two monthly rentals of £9 each (that was the amount of the monthly rental)—so that was the end of the car and the money paid on it—all lost.

I knew then that I had to do something about this terrible state of affairs—**I KNEW I COULD DO IT**.

I had been 'working on' an idea that I had held **SECRET** for many, many years.

Remember—**I WAS BROKE**—in fact, somehow I managed to save the sum of TWO POUNDS (£2) assisted by my wife who had such great faith in me, however just this two pounds to commence—I have never looked back since and I have come a very, very long way, believe me.

I NOW HAVE THREE CARS.

I HAVE A LUXURY HOME and builders have recently completed an extension for me, quite costly of course, it is worth a SIX FIGURE SUM (£100,000) to me now, or if you prefer American Dollars, about $189,000.

My wife, our daughter and myself live very, very comfortably—TO SAY THE LEAST, surely this you now realise.

To give you just two recent examples of my **weekly** payments into my bank account, WORKING PART TIME ONLY REMEMBER—

They were £3,649—THREE THOUSAND, SIX HUNDRED AND FORTY-NINE POUNDS, or if you prefer it in American Dollars, about $6,896.

The second one for £1,836—ONE THOUSAND, EIGHT HUNDRED AND THIRTY-SIX POUNDS, again if you prefer it in American Dollars, about $3,470.

Proofed this paper.

Remember, THESE ARE JUST TWO RECENT WEEKS AS EXAMPLES FOR YOU, working only PART TIME, now are you interested?

This advertisement has been written for YOU—YOU can decide which is best for you—to be broke or to HAVE MONEY—YOU DECIDE, you have my MONEY REFUND INCLUDED of course. There are ONLY TWO KINDS OF PEOPLE IN THIS WORLD—Those who say it can't be done—**AND THOSE WHO DO IT**—like Myself and now, very shortly YOU.

The book I sell is NOT a book of ideas, whereby you have to 'sort out' and secure your own eventual business ideas—it is NOTHING LIKE THAT—it details ONE BUSINESS ONLY at which I've succeeded and at which you will now succeed—it trains you for this ONE BUSINESS ONLY, there is NOTHING ELSE.

I knew what I wanted, when I was down and out—at that time NO ONE WAS INTERESTED IN MY PROBLEMS, this is natural of course—do you know what you want? If it is the ROAD TO RICHES and you SINCERELY wish it, this is for you.

Protect your future and your self respect, whilst at the same time protecting your Family in the future—START MAKING SOME REAL MONEY FOR YOURSELF and STOP DREAMING about it. I've known absolute poverty, been right down, on the floor, it is not very nice—but I DID NOT INTEND TO REMAIN THERE—compare that position with what I have today—apart from my income—THREE CARS—LUXURY HOME—and, Oh Dear so much more than words can ever tell you.

I made all the mistakes, discovered all the pitfalls along the way—**and I paid for them**—none of these will befall you, as you have MY BOOK to guide you and to train you.

Operate entirely from your own Home. No telephone is necessary. No car is necessary. No knocking on doors to sell. Operate solely by post. Every man and woman is a potential customer for you.

Within THREE WEEKS of my commencing on my own, in this business, I can tell you—

I HAD PAID OFF ALMOST ALL OF MY DEBTS AND BOUGHT A CAR, yes within the first THREE WEEKS.

YOU can decide how big you wish to become, it was my intention never to get too large, so I simply 'cut down' and worked only part time, enjoying life to the full and the rest of the time doing whatever I WISHED TO DO, no matter what it was—Fantastic—yes, BUT TRUE.

I make my offer at this time, to enable me to secure more time to write my second book, it will take me at least 12-18 months, but when it is published it will prove to be a sensation, believe me.

It is my intention to pass on the SECRET OF MAKING MONEY to YOU, I KNOW you are already very anxious to learn about it. Even if you are at present employed, you will commence part time, you will soon be presenting your notice to your present employer—TO WORK FOR YOURSELF—remember my own first three weeks—I EVEN BOUGHT A CAR.

Why 'line the pockets' of your employer any longer, start 'lining your own' before you leave it too late. I am not making this offer to MAKE YOU RICH, in order to make myself rich, it is not necessary, you already know why. Working part time, my last financial year shows income well in excess of £70,000 with profits at over £11,000—yes JUST PART TIME, this can be multiplied many times if necessary. For those who wish it, in American Dollars again, this amounts to about $132,300 and profits about $20,790.

I mentioned already that "More than half of the people in the World are Asleep", this is what allows the rest of us (Me and You) to MAKE THE REAL MONEY—because you are about to become one of the AWAKE people—if you WISH TO GROW RICH.

The pessimists say—"It is not possible to succeed on your own any more"—what utter rubbish and absolute nonsense—these people belong to the category that are ASLEEP—believe me, it is easier now than ever it was, but only those who WANT TO MAKE MONEY do so, I KNOW.

I was talking to a Rolls-Royce Owner recently, who said, 'the roads are paved with gold—people just will not help themselves'—it is TRUE you know, it is there for you to help yourself. Just taking, as a small example for you my most recent four years of part time working—on each of those years my income has increased each year over the preceding one—whilst others around me have closed down and gone into Bankruptcy.

Just examine again some of the cash figures I have given you herein, this is only a part, I'm not disclosing everything to you of course, just sufficient to give you an idea of what YOU can now do in my line of business. I started with a capital of just TWO POUNDS.

This offer is made under my MONEY REFUND, it is your GOLDEN OPPORTUNITY OF A LIFETIME TO MAKE MONEY, it is YOUR SUCCESS that matters to me, hence this REFUND OFFER.

Are you prepared to send me just ten pounds (£10) to receive My Book with details of this new business for yourself, you can commence right away. The ROAD TO RICHES awaits you, despatched to your within 48 hours of your order reaching me. Money Refunded if you do not agree and you return to me within 7 days—can I be any fairer than this?

A. W. E. SUMMONS
P.O. Box 30, 8 Dew Street,
Haverfordwest,
Dyfed, Wales.

What have I got to lose. Here is my ten pounds and at the end of the first three months of my new business venture operation, **IF**, I repeat **IF** I've made a clear profit of at least £3,000 I will send you a further £40 completing payment for my book, if I have NOT made this profit, I OWE YOU NOTHING FURTHER, the balance is cancelled—on this understanding and MONEY REFUND here's my tenner.

Name .....

Address .....

.....

.....HCW1

STOP PRESS LETTERS PROOFED TO THIS PAPER

Mr. K. P. of Lancs writes: My account for the first two months of operations.

Expenses (all detailed)	£615.15
Income	£3,196.00
CLEAR PROFIT	£2,580.15

He adds—"may I take this opportunity to thank you for introducing me to this most successful business venture. I am confident that it will provide me with financial security for the years ahead."

Mr. R. O. of London writes: How grateful I am in sending you a cheque for £40, for I have made a CLEAR PROFIT of £3,256.86 at the end of my 3 months period of operations. I'm now more confident that my business will provide me with financial security for the years ahead.

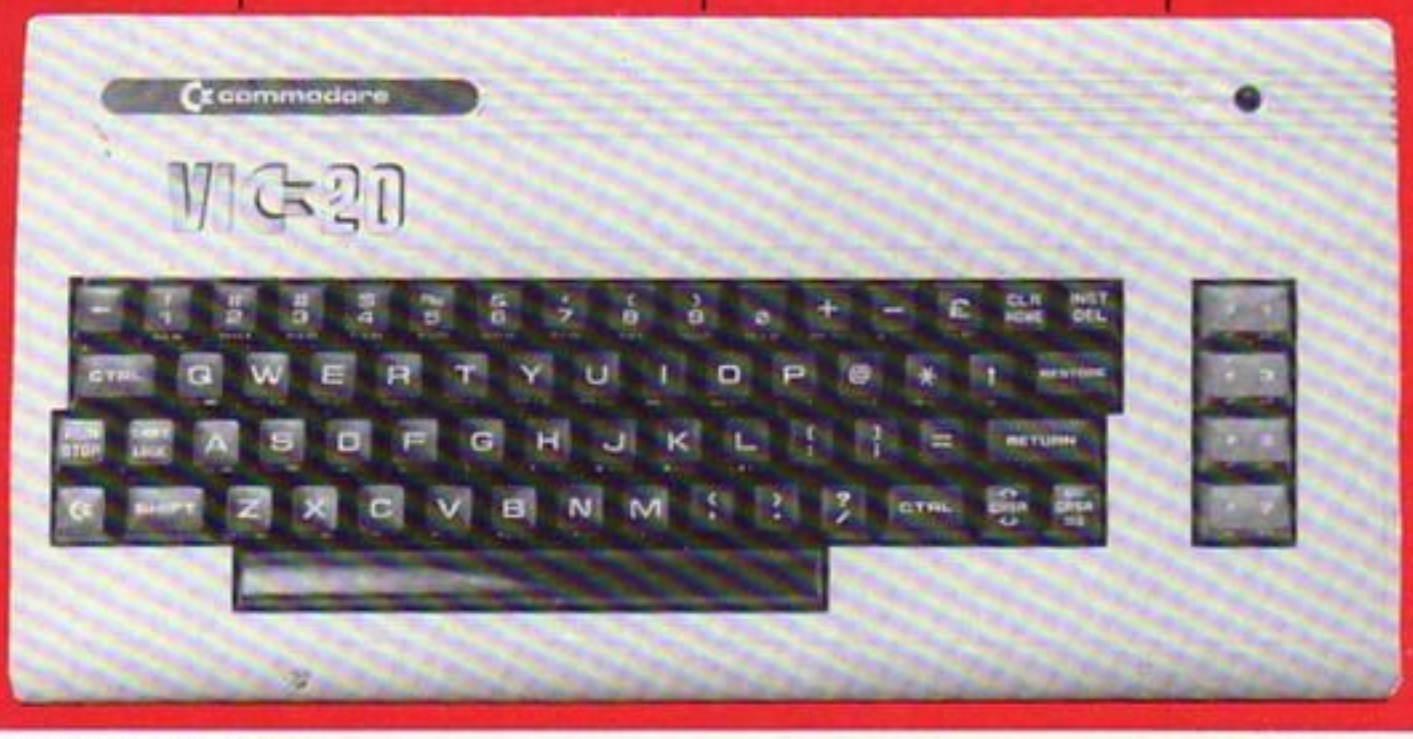
'I would like to add that I am very pleased you have introduced me to this profitable venture'. **J. B., Devon**.

'I have been absolutely amazed by the PROFIT I have made from it . . . thanks to YOU'. **P. J., London**.

'I am having good success'. **E. H., Yorks**.

VIC-20 PROGRAM

Test your a-mazing memory



Get out of that...in seconds. That's all the time you've got to memorise the maze in Kit Watson's program for the VIC-20. And no cheating is allowed

Seconds count in my Memory Maze program, written for the VIC-20 with 3K memory expansion.

First a maze appears on the screen — for just five to 12 seconds. In that time you have to decide the best route from top left to bottom right within a set time limit.

However, you are not completely blind. Twice during the course of the game you can view the maze to see exactly where you are. But this viewing time lasts for only about five seconds.

When the program is run you are asked to input a difficulty level, 1 to 5. This determines the viewing times and the amount of time given to get through the maze.

The instructions are then printed, the time limit set and the maze drawn and coloured.

After several seconds the maze is cleared from the screen, the clock is started and the game begins with the player in the command mode.

In this mode you have four directions from which to choose, selected by pressing these keys:

L for left, or west
R for right, or east
U for up, or north
D for down, or south

Should the maze prove too difficult, you can escape by pressing E. Then you can begin a new game.

The maze may be viewed by pressing V. Be warned though... this option can only be used twice and will only last for up to five seconds.

```
0 REM**MEMORY MAZE**
10 POKE36879,27:PRINT"■■■■■■DIFFICULTY LEVEL(1-5)■":PRINT"■1=VERY HARD 5=EASY■"
15 INPUTDL:IFDL>5ORDL<1THEN10
20 GOSUB380:GOSUB550
25 REM*PRINT MAZE*
30 PRINT"■":L=44:P=102:POKE36879,8:POKE36878,15:M=23:V=0:PRINTCHR$(8)
35 FORC=38400TO38905:POKEC,2:NEXT:DIMA(505):FORB=8164TO7680STEP-22:POKEB,P:NEXT
40 FORB=7680TO7700:POKEB,P:NEXT:FORB=7700TO8184STEP22:POKEB,P:NEXT
45 FORB=7700TO8184STEP22:POKEB,P:NEXT:FORB=8184TO8164STEP-1:POKEB,P:NEXT
50 FORT=7726TO7743STEP2:POKET,P:POKET+L,P:POKET+(L*2),P:POKET+(L*3),P:POKET+(L*4
),P
55 POKET+(L*5),P:POKET+(L*6),P:POKET+(L*7),P:POKET+(L*8),P:POKET+(L*9),P:POKET+(
L*10),P
60 NEXTT
65 FORT=7701TO8185STEP22:POKET,P:NEXT
70 FORT=7726TO7743STEP2:GOSUB135
75 POKET+Z,P:GOSUB135:POKE36874,200+X*10
80 POKET+L+Z,P:GOSUB135:POKE36874,200+X*10
85 POKET+(L*2)+Z,P:GOSUB135:POKE36874,200+X*10
90 POKET+(L*3)+Z,P:GOSUB135:POKE36874,200+X*10
95 POKET+(L*4)+Z,P:GOSUB135:POKE36874,200+X*10
100 POKET+(L*5)+Z,P:GOSUB135:POKE36874,200+X*10
105 POKET+(L*6)+Z,P:GOSUB135:POKE36874,200+X*10
110 POKET+(L*7)+Z,P:GOSUB135:POKE36874,200+X*10
115 POKET+(L*8)+Z,P:GOSUB135:POKE36874,200+X*10
120 POKET+(L*9)+Z,P:GOSUB135:POKE36874,200+X*10:POKE36874,0:NEXTT
125 FORT=38400TO38905:POKET,1:NEXT
130 GOTO165
135 X=0:X=INT(RND(1)*4)+1:Z=0
140 IFX=1THENZ=-1:GOTO160
145 IFX=2THENZ=-22:GOTO160
150 IFX=3THENZ=22:GOTO160
155 IFX=4THENZ=1
160 RETURN
165 POKE7703,42:POKE8161,90
170 REM**PUT PLAN OF MAZE**
175 REM**IN ARRAY**
180 FORT=0TO505:A(T)=PEEK(7680+T):NEXTT:FORD=1TO(DL*1000):NEXTD:PRINT"■■"
185 REM*SET CLOCK*
190 TI$="000000":A(23)=32:Q$=CHR$(Q+48):Q1$=Q$+"00"
195 GOSUB285
200 IFQ1=1THEN250
205 IFA(M)<>90THEN195
```

VIC-20 PROGRAM

```
210 H$=MID$(TI$,3,2):M$=RIGHT$(TI$,2)
215 POKE36879,27:PRINT"■■■■■■WELL DONE!"
220 PRINT"■■YOU TOOK ";H$;".";M$;" MINUTES":PRINT"TO COMPLETE THE MAZE"
225 PRINT"■■PLAY AGAIN(Y/N)?"
230 GETP$:IFP$=""THEN230
235 IFP$="Y"THENRUN
240 IFP$="N"THENPOKE36879,27:PRINT"■";:END
245 GOTO230
250 PRINT"■■■■■■■■■■BETTER LUCK NEXT TIME!"
255 PRINT"■■DO YOU WISH TO SEE    WHERE YOU REACHED(Y/N)?"
260 GETB$:IFB$=""THEN260
265 IFB$="Y"THENDL=8:GOSUB360:GOTO280
270 IFB$="N"THEN225
275 GOTO260
280 GOTO225
285 REM*COMMANDS*
290 POKE36879,236:D=0:PRINT"■"
295 PRINT"■";RIGHT$(TI$,3);"■■■■■NO.OF VIEWS";2-V
300 IFRIGHT$(TI$,3)=Q1$THENQ1=1:RETURN
305 PRINT"■■■■■■■■COMMAND(U,D,L,R,V,E)?"
310 GETD$:IFD$=""THEN295
315 IFD$="U"THEND=-22:GOTO350
320 IFD$="D"THEND=22:GOTO350
325 IFD$="L"THEND=-1:GOTO350
330 IFD$="R"THEND=1:GOTO350
335 IFD$="V"THENGOSUB360:GOTO285
340 IFD$="E"THEN250
345 GOTO310
350 M=M+D:IFA(M)<>PTHENPRINT"■■■.K.":FORG=1TO400:NEXTG:POKE198,0:RETURN
355 M=M-D:PRINT"■■YOU CAN'T GO THAT WAY!":FORG=1TO400:NEXTG:POKE198,0:GOTO230
360 REM*VIEW*
365 IFV=2THENRETURN
370 PRINT"■":FORT=0TO505:POKE7680+T,A(T):NEXT:POKE8161,90:POKE7680+M,42
375 FORD=1TO(DL*800):NEXTD:V=V+1:PRINT"■":RETURN
380 REM*INSTRUCTIONS*
385 PRINTCHR$(14):PRINT"■";
390 PRINT"■N THIS GAME YOU MUST"
395 PRINT"GET FROM THE TOP LEFT"
400 PRINT"OF THE MAZE TO THE "
405 PRINT"BOTTOM RIGHT CORNER IN";
407 PRINT"THE TIME LIMIT ALLOWED";
410 PRINT"OHEN THE MAZE IS DRAWN";
415 PRINT"YOU MUST STUDY IT AND"
420 PRINT"DECIDE ON THE BEST WAY";
425 PRINT"TO GET THROUGH."
430 PRINT"■FTER ABOUT";((DL*1000)/500)+5;"SECONDS";
435 PRINT" THE MAZE WILL VANISH"
440 PRINT"AND A LIST OF COMMANDS";
445 PRINT"WILL BE DISPLAYED."
450 PRINT"■■L=LEFT  ■=■IGHT"
455 PRINT"■■=■OWN  ■=P  ■=■SCAPE";
460 PRINT"■RESSING 'X' WILL LET"
465 PRINT"YOU VIEW THE MAZE,BUT"
470 PRINT"YOU CAN ONLY DO THIS"
475 PRINT"TWICE."
480 PRINT"■IIT ■NY ■EY■"
485 GOSUB565
490 PRINT"■■"
495 PRINT"OHEN THE MAZE IS":PRINT"VIEWED YOUR POSITION "
500 PRINT"WILL BE SHOWN AS A '*'";
505 PRINT"AND THE MAZE END AS A"
515 PRINT"■IAMOND"
520 PRINT"■■IIT ■NY ■EY■"
525 GOSUB565
530 Q=0:Q=INT(RND(1)*DL)+1
535 IFQ>1THENM1$="MINUTES!":GOTO545
540 M1$="MINUTE!"
545 PRINT"■";CHR$(142);:RETURN
550 REM*HOW MUCH TIME?*
555 PRINT"■■■■■■■■■■    GOOD LUCK!":PRINT"    ---- ----"
560 PRINT"■■■YOU HAVE";Q;M1$:FORT=1TO2000:NEXT:RETURN
565 GETA$:IFA$=""THEN565
570 RETURN

READY.
```

How it runs:

Line 10 clears screen and sets screen and border colours.
Lines 30 to 160 print maze on screen.
Line 180 puts plan of maze in array A.
Line 190 sets internal clock to 000000.
Lines 200 to 205 check if time up or end of maze reached.
Lines 215 to 245 print CONGRATULATIONS and display time taken to complete maze.
Lines 250 to 280 print BAD LUCK and check whether player wishes to see position reached.
Line 290 to 355 print COMMAND part of Program and move player through maze.
Lines 365 to 375 print maze again for player to view.
Lines 390 to 570 print instructions and time limit.

Variables

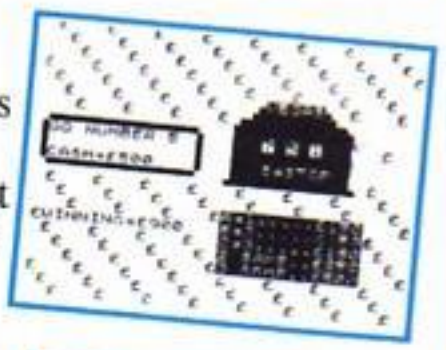
P — value of character representing maze walls.
V — number of views.
M — Initial position of player in maze.
A(505) — array holding maze plan.
X, Z — numbers which determine where a maze wall will be printed.
DL — difficulty level.
Q — random number based on DL which determines time limit.
TI$ — VLC's internal clock.
QI$ — time limit.
QI — if this is 1 then time is up.

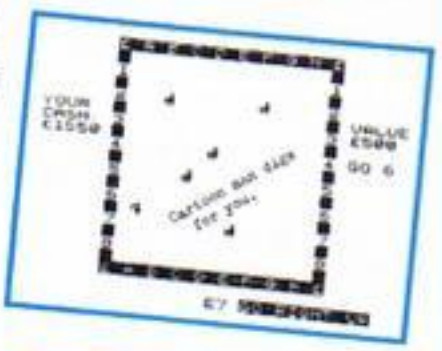
Hints on conversion: With the exception of the poke and peek commands and some of the print statements, the program should be easily converted to run on most machines. Below is a list of memory locations used and their purpose and some Print statements.
7680 to 8185 — for screen memory.
38400 to 38905 — for screen colour memory.
36874 — for the bass sound generator.
36878 — this controls the volume of the sound generators.
36879 — this controls the screen and border colours.
PRINT CHR$ (142) switches to upper case mode.
PRINT CHR$ (14) switches to lower case mode.
PRINT CHR$ (8) locks Vic in upper or lower case.
REVERSE S — Curser home.
REVERSE Heart — clear screen curser home.
REVERSE Q — Curser down.
REVERSE — Curser right.
The graphic characters in lines 390 — 520 print capital letters when in the lower case mode.

SPECTRUM 16K or 48K

VENTURE

SPECTRUM 16K or 48K





New VENTURE Cassette (7 games in 1). Now uses ALL the user defined graphics (with colour & sound). Can YOU survive the 7 sections and collect the gold & cash, and be presented with a Cheque for the winnings, or a Summons if you dare to lose?

Winnings from one section carried over into next setion. Altho' basically ran as an Adventure type game, you are not just told 'Dead...Game Over' (how boring). If you lose a section, your cash is halved & you carry on.

VENTURE is an all action cassette. Even when rules are appearing on the video, something is moving about the screen.

More? O.K. As a free extra bonus, another three ong & compulsive games are on the reverse side of the cassette.

Cassette Title: VENTURE

POST £6 FREE.

• ALSO •

LISTFILE

This is an all purpose Business type program designed for the 48K SPECTRUM and Printer. (Can be ran in the 16K machine but would only hold around 50 names and addresses).

Holds upto about 600 names & addresses...could instead be items & prices, etc.

Facilities built-in are:

1. Print-out all...Can also Print-out just one or several.
2. Present addresses to video...All or just one.
3. Search for Name.
4. Search for Town.
5. Search by single character...A complete name & address can be found by entering a single character.
6. Search repeat...Example: Find addresses of all Heron Garages, etc, etc.
7. Insert extra name & address in between two others.
8. Delete a name & address.
9. Add extra name & address to the list.

Depending on your format, Search could be by telephone number, persons interests, etc, etc.

Program LISTFILE can be supplied tailor-made to your requirements if different to the above.

LISTFILE is 'user friendly' with majority of actions clearly displayed on the video. SAVE & VERIFY is done by simply pressing one key AND message 'SAVED O.K.' appears if all SAVED.

LISTFILE supplied on cassette with full instructions AND with after sales help if required.

POST £10 FREE.

G. A. BOBKER. 29 CHADDERTON DRIVE, UNSWORTH, BURY, LANCS, BL9 8NL.
Tel: 061-766 5712.

Bombs away – and you're in the pilot's seat

Here's two versions of the classic arcade game, Bomber.

First John Power presents his program for the TI 99/4A and then Mark Bowyer describes his version for both models of the BBC micro

In my Bomber program you are the pilot of a crippled jet and the only way to land safely is to destroy the towers to clear a landing strip.

You are given the choice of three skill levels, each giving you a different number of bombs.

When you have chosen the game screen will be set up with your bomber at the top of the screen and a set of towers of random heights at the bottom.

Press any key to start the bomber moving. Engine trouble means you are losing height.

To destroy the towers, press key B to release your bombs. The bombs travel at an angle of 45 degrees and destroy buildings if they hit the roofs.

On levels two and three you can only release two bombs for every pass across the screen. If you hit a building your bomber will be destroyed.

The game can then be replayed or you can end.

How it runs:

10-110 define characters
120-270 set colours, level, variables
280-450 set layout of screen and bombs counter
460-630 set random height, pattern of towers and prints them
640-910 move bomber, check if B is pressed, updates score
910-1200 move bomber and bomb, check if bomb hits tower
1210-1270 erase tower, sounds explosion
1280-1330 routine to print score
1340-1570 bomber crashed, prints info on score, option to run or end
1580-1830 mission successful, then as above
1840-2240 starting sub-routine, set variables according to level, print text

Apart from some unusual graphics commands, TI Basic is mostly standard. The Texas machine will not accept multiple assignments, nor multiple line statements. Room could be saved on other machines which have these facilities, especially in the case of long variable lists.

The CALL CHAR statement re-defines characters over the ASCII range 32-159. The characters take the form of an eight by eight grid square split vertically into two four by eight halves. Therefore one hexadecimal number refers to one pattern in one of the four by eight blocks. The character is defined left to right, from the top.

CALL HCHAR is used to position the character on the 32 by 24 screen, and repeat it horizontally. This can be replaced by a poke to the screen, or similar statement on other machines.

CALL VCHAR repeats a character vertically. CALL GCHAR returns the ASCII value of the character present on the screen at the given co-ordinates. This can be used to detect collisions, and can be replaced by peek on other machines.

CALL CLEAR clears the screen, CALL SCREEN sets the screen colour, and CALL COLOR sets character color, the arguments being character set number (on the TI ASCII codes are split into 16 blocks of eight codes) foreground color, background color. CALL SOUND speaks for itself, and is easily replaced by a similar command on another machine.

Variables:

OBR — Bombs (original)
BMS — Bombs
RW — Row (on screen)
CL — Column (on screen)
CHO — Original bomber position
SH — Shots made per line
RS — Random tower pattern
TW — ASCII value of character
RH — Random height of towers
COL — screen positions of towers
SL — Skill level
Z — Row of printed message
V — Col of printed message
TC — Variable holding ASCII char value found by GCHAR
TH — same as above
CT — Col position of bomb
RT — Row position of bomb

Bomber for the TI 99/4A

```
10 REM  ***BOMBER                  J.POWER 15/1/83***
20 CALL CHAR(96,"55AA55AA55AA55AA")
30 CALL CHAR(97,"0F0F0F0FF0F0F0F0")
40 CALL CHAR(98,"FF00FF00FF00FF00")
50 CALL CHAR(104,"209098FE7F181020")
60 CALL CHAR(105,"0000207020000000")
70 CALL CHAR(99,"00000000000000FF")
80 CALL CHAR(112,"000000000183C7EF")
90 CALL CHAR(100,"00FF000000000000")
100 CALL CHAR(107,"829254EE54928200")
110 CALL CHAR(120,"FFFFFFFFFFFFFFFF")
120 CALL COLOR(9,2,15)
130 CALL COLOR(12,15,6)
140 CALL COLOR(10,2,6)
150 CALL COLOR(11,5,6)
160 CALL CLEAR
170 REM **STARTING ROUTINTE**
180 GOSUB 1840
190 REM **RETURN FROM STARTING ROUTINE-WITH DATA
200 CALL CLEAR
210 FOR QQ=3 TO 8
220 CALL COLOR(QQ,2,15)
230 NEXT QQ
240 OBR=BMS
250 RW=CHO
260 CL=2
270 SH=0
280 FOR X=1 TO 3
290 CALL HCHAR(X,1,120,32)
300 NEXT X
310 CALL HCHAR(23,1,120,32)
320 CALL HCHAR(24,1,120,32)
330 CALL SCREEN(6)
340 M$="BOMBER"
350 Z=2
360 V=6
370 GOSUB 1290
380 CALL HCHAR(1,7,99,6)
390 CALL HCHAR(3,7,100,6)
400 M$="BOMBS="&STR$(BMS)
410 Z=2
420 V=18
430 GOSUB 1290
440 CALL HCHAR(1,19,99,8)
450 CALL HCHAR(3,19,100,8)
460 REM  **SET UP TOWERS**
470 COL=7
480 FOR RTD=1 TO 20
490 RANDOMIZE
500 RS=INT(RND*3)+1
510 IF RS=1 THEN 520 ELSE 540
520 TW=96
530 GOTO 590
540 IF RS=2 THEN 550 ELSE 570
550 TW=97
560 GOTO 590
570 IF RS=3 THEN 580 ELSE 500
580 TW=98
590 RH=INT((HL-LL+1)*RND)+LL
600 CALL VCHAR(22-RH,COL,112)
610 CALL VCHAR(23-RH,COL,TW,RH)
620 COL=COL+1
630 NEXT RTD
640 REM **BOMBER MOVEMENT**
650 CALL KEY(0,K,S)
660 CALL HCHAR(RW,CL,104)
670 CALL HCHAR(RW,CL,32)
680 IF S=0 THEN 650
690 CALL HCHAR(RW,CL,104)
700 CALL KEY(0,K,S)
710 IF S=1 THEN 720 ELSE 760
720 IF K<>66 THEN 760
730 IF (SL=2)+(SL=3)THEN 740 ELSE 750
740 IF SH=2 THEN 760 ELSE 750
750 IF CL>=32 THEN 760 ELSE 910
760 CALL HCHAR(RW,CL,32)
770 CL=CL+1
780 IF CL>32 THEN 790 ELSE 870
790 M$=STR$(BMS)&"x"
800 Z=2
810 V=24
820 GOSUB 1290
830 SH=0
840 CL=1
850 RW=RW+1
860 IF RW=23 THEN 1580
870 CALL GCHAR(RW,CL,TC)
880 IF TC=112 THEN 1340 ELSE 890
890 CALL HCHAR(RW,CL,104)
900 GOTO 700
910 REM **BOMB AND BOMBER MOVEMENT**
920 RT=RW+1
930 CT=CL+1
940 IF BMS=0 THEN 700
950 BMS=BMS-1
960 SH=SH+1
970 CALL GCHAR(RT,CT,TH)
980 IF TH=112 THEN 1210 ELSE 990
990 CALL HCHAR(RT,CT,105)
1000 CALL SOUND(-100,-5,2)
1010 CALL HCHAR(RW,CL,32)
1020 CL=CL+1
1030 IF CL>32 THEN 1040 ELSE 1070
1040 CL=1
1050 SH=0
1060 RW=RW+1
1070 CALL GCHAR(RW,CL,TC)
1080 IF TC=112 THEN 1340 ELSE 1090
1090 CALL HCHAR(RW,CL,104)
1100 CALL HCHAR(RT,CT,32)
1110 CT=CT+1
1120 RT=RT+1
1130 IF RT>=22 THEN 700 ELSE 1140
1140 IF CT>32 THEN 700
1150 CALL GCHAR(RT,CT,TH)
1160 IF TH=112 THEN 1210 ELSE 1170
1170 IF (TH=96)+(TH=97)+(TH=98)THEN 700
1180 CALL HCHAR(RT,CT,105)
1190 CALL SOUND(-50,2000,20)
1200 GOTO 1010
1210 REM  ***TOWER ERASE***
1220 CALL HCHAR(RT,CT,107)
1230 CALL SOUND(-750,110,2,-6,0,192,2)
1240 CALL VCHAR(RT,CT,32,23-RT)
1250 Z=2
1260 V=24
1270 GOTO 700
1280 REM *** "PRINT AT" ROUTINE***
1290 FOR LOS=1 TO LEN(M$)
1300 CODE=ASC(SEG$(M$,LOS,1))
1310 CALL HCHAR(Z,V+LOS,CODE)
1320 NEXT LOS
1330 RETURN
1340 REM  ******BOMBER CRASHED******
1350 CALL HCHAR(RW,CL,107)
1360 CALL SOUND(-1250,196,2,-7,0,110,2)
1370 FOR X=1 TO 250
1380 NEXT X
1390 FOR QQ=3 TO 8
1400 CALL COLOR(QQ,2,8)
1410 NEXT QQ
1420 CALL CLEAR
1430 CALL SCREEN(8)
1440 GOSUB 2170
1450 PRINT TAB(3);"YOUR BOMBER HAS CRASHED.":
1460 PRINT TAB(5);"YOU HAD";BMS;"BOMBS LEFT-":
1470 PRINT TAB(4);"OUT OF YOUR ORIGINAL";OBR
1480 PRINT :
1490 GOSUB 2200
1500 PRINT :
```

```
1510 CALL KEY(0,K,S)
1520 IF S=0 THEN 1510
1530 IF K<>80 THEN 1550
1540 GOTO 180
1550 IF K<>69 THEN 1510
1560 CALL CLEAR
1570 END
1580 REM ***MISSION SUCCESFUL***
1590 CALL SOUND(200,370,2,440,2,294,2)
1600 CALL SOUND(600,392,2,494,2,294,2)
1610 CALL SOUND(200,391,2,494,2,292,2)
1620 CALL SOUND(800,294,2,440,2,370,2)
1630 FOR QQ=3 TO 8
1640 CALL COLOR(QQ,2,8)
1650 NEXT QQ
1660 CALL CLEAR
1670 CALL SCREEN(8)
1680 GOSUB 2170
1690 OBRZ=OBR
1700 BL=OBR-BMS
1710 PRINT "CONGRATULATIONS,YOUR MISSION"::
1720 PRINT TAB(9);"WAS SUCCESFUL."::
1730 PRINT TAB(7);"YOU USED";BL;"BOMBS,"::
1740 PRINT TAB(5);"FROM YOUR ORIGINAL";OBRZ
1750 PRINT ::
1760 GOSUB 2200
1770 CALL KEY(0,K,S)
1780 IF S=0 THEN 1770
1790 IF K<>80 THEN 1810
1800 GOTO 180
1810 IF K<>69 THEN 1770
1820 CALL CLEAR
1830 END
1840 REM **STARTING ROUTINE**
1850 CALL CLEAR
1870 PRINT "PRESS:"::
1880 PRINT TAB(5);"1 FOR LEVEL 1-30 BOMBS"::
1890 PRINT TAB(5);"2 FOR LEVEL 2-24 BOMBS"::
1900 PRINT TAB(5);"3 FOR LEVEL 3-22 BOMBS"::
1930 CALL KEY(0,K,S)
1940 IF S=0 THEN 1930
1950 IF K<>49 THEN 2020
1960 SL=1
1970 HL=6
1980 LL=4
1990 BMS=30
2000 CHO=4
2010 GOTO 2150
2020 IF K<>50 THEN 2090
2030 SL=2
2040 HL=7
2050 LL=4
2060 BMS=24
2070 CHO=4
2080 GOTO 2150
2090 IF K<>51 THEN 1930
2100 SL=3
2110 HL=7
2120 LL=3
2130 BMS=22
2140 CHO=6
2150 RETURN
2210 PRINT"*PRESS:  P TO PLAY          *"
2220 PRINT "*         E TO END.          *"
2230 RETURN
```

Bomber for the BBC micro is also based on the idea of destroying a skyline to land your aircraft.

The program displays the instructions in Mode 7 and plays the game in Mode 5 using programmable characters.

Here's an explanation of some of the commands used in the program:

*FX 15,0 in line 120 clears the contents of the keyboard buffer.

*FX 4,1 allows the cursor keys to give their codes rather than their specialist functions. The codes used are: hex 8A down arrow, hex 8B up arrow, decimal 70 F key.

*FX 4,0 returns the cursor keys to their normal functions.

The SOUND commands in lines 70 and 280 create short explosion-type noises, the one in 280 being slightly louder and longer than the one in 70.

*FX 11,14 sets the auto repeat speed.

*FX 12 returns all keyboard associated attributes to normal.

VDU 23 in lines 610-650 define character codes as follows: 250 checkered black, 251 tail section of bomber, 252 centre section, 253 front section of bomber, 254 the bomb.

DEF FNS(X,Y)...in line 760 returns the first byte, of eight, of a character at co-ordinates (X,Y). It is used in line 70 to detect whether the bomber has hit the skyline block and in 730 to detect whether the bomb has hit a skyline block. This function works only in Mode 7.

The PROC sub-routines:

PROCINSTRUCTIONS prints instructions in Mode 7.

PROCINIT initialises variables and prints a randomly generated skyline.

The movement of the bomber takes place in lines 60-220.

PROCBOMBINIT initialises the bomb position and prints it.

PROCBOMB erases the bomb, checks to see if a skyline row has been completely destroyed or checks to see whether a bomb has absorbed four blocks of skyline.

PROCLANDED prints a 'landed' message in yellow and passes control to the 'Another game' routine in lines 350-440.

PROCCRASH does the same as PROCLANDED, except it prints a crash message instead along with an explosion covering the bomber.

BBC micro version of the Bomber

```
  10  MODE 7
  20  PROCINSTRUCTIONS
  30  MODE 5
  40  PROCINIT
  50  FOR X=0 TO 19
  60    Y=0
  70    IF TFNS(X+2,Y+1)=0 OR TFNS(X,Y+1)=0 THEN L=-(1)SOUND 0,-7,5,5
  80    PRINTTAB(X,Y);CHR$(253);CHR$(252);CHR$(253)
  90    PRINTTAB(12,25);"FUEL:";FL;"  ";
 100    PRINTTAB(1,25);"LIVES:";LI;"  ";
 110    IF L=0 THEN PROCCRASH:GOTO350
 120    A=INKEY(0):*FX 15,0
 130    IF X=20 AND Y=0 THEN PROCBOMBINIT
 140    IF X=BB AND FL>0 AND H>2 THEN H=H-1:FL=FL-1
 150    IF X=BB THEN H=H+2
 160    IF Y=1 THEN PROCBOMB
 170    FOR T=0 TO 1:NEXT
 180    PRINTTAB(X,Y);"  ";
 190    IF H>19 THEN PROCLANDED:GOTO350
 200    NEXT
 210  H=H+1
 220  GOTO 50
 230  DEF PROCLANDED
 240  COLOUR 2
 250  PRINTTAB(3,20);"YOU'VE LANDED"
 260  ENDPROC
 270  DEF PROCCRASH
 280  SOUND 0,-5,6,45
 290  FOR Q=0 TO 120
 300    X=RND(20):H=RND(40)+1:Y=RND(255)
 310    NEXT:PRINTTAB(X,H);"  ";
 320  COLOUR 2
 330  PRINTTAB(3,20);"YOU'VE CRASHED"
 340  ENDPROC
 350  FOR I=0 TO 5000:NEXT
 360  COLOUR 3
 370  PRINTTAB(4,20);"PRESS 'Y' TO ";
 380  *FX 15
 390  A$=GET$
 400  IF A$="Y" THEN RUN
 410  IF A$="N" THEN GOTO450
 420  GOTO390
 430  *FX 4,0
 440  MODE 7:END
 450  DEF PROCBOMB
 460  PRINTTAB(G,J);" ";
 470  IF W=4 THEN W=0:F=0:ENDPROC
 480  IF J=20 THEN W=0:F=0:ENDPROC
 490  J=J+1:GOTO730
 500  DEF PROCINSTRUCTIONS
 510  *FX 4,1
 520  PRINTCHR$(12)"";CHR$(131);CHR$(157);"         SKY-LINE DEMOLITION";"";CHR$(157);CHR$(130
0"         SKY-LINE DEMOLITION"
 530  PRINT"""  The object of this game  is to destroy","the city. You are the
pilot of a small","bomber & you can use bombs released","by the 'F' key to dem
olish the city."
 540  PRINT"To control your height use the keys","marked with the arrows.""How
ever each time the 'UP' key is used","a unit of fuel is lost."
 550  INPUT""Enter the speed at which you wish the""bomber to travel (20=hard
, 100=easy)";D
 560  PRINT"";CHR$(157);"  PRESS ANY KEY TO BEGIN THE GAME .";:G=GET:ENDPROC
 570  DEF PROCINIT
 580  *FX 11,14
 590  VDU 23;0;0;0;0;0;
 600  L=48:F=0:W=0:FL=40
 610  VDU 23,250,&aa,&55,&aa,&55,&aa,&55,&aa,&55
 620  VDU 23,251,&FF,&FF,&7F,&3F,&1F,&0F,&07,&03
 630  VDU 23,252,&00,&FF,&FF,&aa,&aa,&FF,&FF,&00
 640  VDU 23,253,&00,&80,&C0,&FF,&FF,&C0,&80,&00
 650  VDU 23,254,&00,&0a,&0a,&04,&0E,&0E,&04,&04
 660  FOR X=0 TO 19
 670    FOR Y=3+RND(17) TO 20
 680      PRINTTAB(X,Y);CHR$(250)
 690      NEXT:NEXT:I=3
 700  ENDPROC
 710  DEF PROCBOMBINIT
 720  J=L:G=X:F=1
 730  IF TFNS(G,J+1)=&aa OR TFNS(G,J+1)=&55 THEN W=W+1
 740  PRINTTAB(G,J);CHR$(254);
 750  ENDPROC
 760  DEF FNS(X,Y)=HIMEM+(Y*40+X)*8
```

FEELING ADVENTUROUS?

ASP Software Adventure Series 1

THE WHITE BARROWS Program approximately 8K
Somewhere amid this maze of burial chambers lurks an Evil Sorcerer whom you need to trap. Trouble is, he's protected by Trolls, Dwarves, Serpents and the occasional Dragon or two! Your magic staff will block the tunnel to prevent him escaping unless, that is, he outwits you.

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There are other ways of making money than bashing Trolls on the head. Try this one for a change. Contend with a fluctuating economy, tax investigations, bullish opponents, impatient bank managers and consortium takeovers as you struggle to make your first million.

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Which ZX81 programs are best?
The answer's in our stars

Don't buy another program for your ZX81...until you've read Ray Elder's reviews. He has spent hours on your behalf sorting out the good from the not so good

★ poor
★★ average
★★★ good
★★★★ very good
★★★★★ excellent

Reversi £6.95

Mine of Information, 1 Francis Avenue, St Albans, Herts AL3 6BL.

This is a computer version of the board game, also known as Othello, and can be played by two people against each other or by one player against the computer. Reversi is a sort of thinking man's draughts, originally played with counters on an eight by eight board.

Full instructions for playing the computer version, including rules and playing hints, are supplied. The tape loaded first time, typing RUN produced a menu of options. The full range of options is superb; one or two players, sample game, change sides, choice of who starts, replay game, set up board and nine levels of play.

The program is written in machine code and has a fast response. At level one it's almost instantaneous, although at higher levels it slows considerably. The screen display is set out simply and clearly with an update score displayed. Moves are entered by letter-number, D6 for example, and invalid moves are not allowed. The program seems to be well error-trapped — it resisted my best efforts to confuse it.

It has just about all the features that both beginners and experts are likely to need and its playing ability is high indeed. I refuse to say how many times it beat me at level one.

instructions	80%
playability	90%
graphics	90%
value for money	100%

★★★★

Super Glooper /Frogs £4.95

Psion, 2 Huntsworth Mews, Gloucester Place, London W1 6DD.

Two excellent arcade-type games on one cassette. Both loaded easily and started automatically. They are well written with a choice of skill levels, high score feature and dynamic graphic displays. Both also feature the same keyboard controls: any key 1 to 5 moves up, Q to T is left, Y to P is right and Z to B moves down. Keys A to G provide a useful pause feature. Unusual controls, but easy after a little practice.

Super Glooper is a Pacman-type game. You have to 'paint' the maze, avoiding the aliens which do not chase you but move at random. There are four 'shields' which give you the power to destroy them. Once the maze has been painted a new and more difficult maze is drawn. You have three lives.

The only criticism I have is that the Glooper does not appear at the start of each turn — you have to press a suitable movement key first.

Frogs is a simple version of the Frogger-style game. Just hop from boat to boat across the river to your five home bases. You have eight lives.

The instructions are brief but adequate. Two very addictive machine code games.

instructions	70%
playability	80%
graphics	80%
value for money	80%

★★★★

The Ship of Doom £7

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA.

You are on board your spaceship which is trapped inside a huge alien craft. Your task is to explore the alien ship, free your spaceship and escape. To do this you must find various objects and use them in the correct manner to complete the game. It's not easy and not achieved in one attempt. I was thankful for the save game feature.

This is the third, adventure C, in Artic's series of excellent machine code adventures. The format remains the same — no graphics, a written report on your location, objects and exits, and a fast response to commands. Instructions are usually entered as two words but the program accepts N, S, E or W for movement. The supplied instructions outline the situation and away you go, with only your wits and an occasional cryptic HELP clue.

One problem with this type of game is that you're never sure if something is intended or if it is a genuine bug. On typing 'wear specs' the screen went black. Five minutes later I decided that the game had crashed. Repeating this produced the same apparent crash. Is this intended or is it a bug? Help.

instructions	70%
playability	90%
graphics	—
value for money	80%

★★★★

Toolkit £5.95

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA.

This utility program extends the 16K ZX81 instruction set to include nine more functions:

Renumber will renumber all your program lines, including GOTOs and GOSUBs. You specify the number to start from and the steps in which they are numbered. Indirect or calculated GOTOs and GOSUBs are not renumbered but are reported on completion.

Delete removes a specified number of program lines.

Memory reports, in bytes, how much memory is left.

Dump reports on the variables used and their values after a program run.

Find reports and lists lines containing a specified word/s.

Replace replaces any specified word or string with another.

Save and **Append**, used together, provide a 'merge' function.

Remkill removes all REMarks.

I had great fun with this program, renumbering a test program in all sorts of step sizes, removing bits of it, checking memory, replacing words and killing Rems. All functions ▶

worked perfectly. The tape loaded first time, transferred itself above Ramtop and was ready for use. The instructions are well written, detailed and easy to understand.

This is a useful but not essential program. I can't help feeling that most of its use will be 'because it's there'.

instructions	70%
usability	90%
graphics	—
value for money	70%

★ ★ ★ ★

Planet of Death £5

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA.

This game, adventure A on Artic's list, follows the traditional adventure format. It does not use graphics. At the start of the game and after moving, the screen is cleared and a text description of your location, objects and obvious exits is displayed. You enter your instruction — usually two words like get rope — and the program will recognise N, S, W or E for directions. The computer responds instantly, usually YOU CAN'T to my instructions.

The tape loaded at the third attempt. I noted the volume setting on my cassette player and subsequent loadings were perfect. The instructions are deliberately vague but the program offers a few hints. It says there are more than 100 commands; I think I've found about 20. Typing HELP may get you a cryptic clue, but more often an infuriatingly unhelpful message.

I loved this game. The satisfaction I felt on solving a simple problem was great. When, and if, I complete it I'll celebrate wildly.

The task set by the game is to find your captured and disabled spaceship and escape from the alien planet. I found one spelling mistake — a bared window — but with these games it might be significant. I spent ages thinking of possible implications. Or was it just an error?

instructions	80%
playability	90%
graphics	—
value for money	90%

★ ★ ★ ★ ★

1K Games £6

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA.

First the good news: the tape contains 11 games. Now the bad news: all the games are written in Basic. I consider these games to be poor quality, graphically limited and uninspired.

Most of them use a flickering animation technique. I'm sure a company with Artic's expertise and reputation could have produced better. Writing them in machine code, for instance, would make 100 per cent improvement.

The games are: Slot Machine, Art, Slalom, Catch Me If You Can, Space Pirate, Spacefire 1, Spacefire 2, Car Crash, Man-eating Budgies, Maze and The Wall. Some of the ideas are good and would have produced interesting games if written differently.

The tape loaded first time and the instructions supplied are clearly written. Children aged between six and 10 may enjoy these for five minutes or so, but anyone else would be better advised to use their money to buy a book or magazine of 1K programs and type them in. There would be more fun and satisfaction and the game is likely to be just as good as any on this cassette.

If I had to choose I would say that Maze and The Wall were the best. They were nearly interesting.

instructions	60%
playability	20%
graphics	30%
value for money	20%

★

Chess £2.95

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA.

A complete chess-playing program and all packed into 1K of memory. The memory limitation means that certain details of the game have to be omitted: you can't capture en passant or achieve pawn promotion. The program is in machine code and loaded at the third try, but it only takes 25-30 seconds to load anyway.

There are two programs on each side and the choice of which is loaded determines the opening move, either white queens pawn or white kings pawn moved. Moves are entered number-letter of the piece to be moved followed by the number-letter of the square to move to. Only valid moves are allowed.

The ZX81 seems to choose its move by testing all possible moves and then selecting the move which captures your highest valued piece, if any. Although this makes it vulnerable to traps, it still produces play which needs some thought to beat. The screen display is small — one ZX character square equals one board square — and pieces are represented by letters, P, Q and K for example, in normal (black) and inverse (white). The display can cause confusion and I mistakenly moved the wrong piece once or twice due to this.

The instructions are minimal. The rules and piece moves are not explained.

instructions	30%
playability	60%
graphics	50%
value for money	80%

★ ★ ★

Thro' the Wall /Scramble £4.95

Psion, 2 Huntsworth Mews, Gloucester Place, London W1 6DD.

Two good arcade-type graphics games, both of which loaded easily and offered a choice of skill levels. I found the easiest too slow and the fastest about right. The graphics are good, but not exceptional, and both games are written in machine code.

Thro' the Wall is a version of Breakout. A ball has to be bounced off your bat, which is at the bottom, to knock out the bricks at the top. The ball, a pixel, moves a little unevenly but predictably and the bat responds smoothly and quickly to key presses. A good version, but not in the 'addictive' class.

Scramble is a reasonable conversion of the arcade game. I found this more absorbing than the 'main' game. You control a plane flying over rocky ground. You can move in four directions and fire missiles at flying As or at rockets which take off and attack you. The game increases in difficulty as you progress.

The instructions are brief but give a clear explanation of the game. Key response is smooth and fast. I found myself having 'just one more go' on the Scramble game.

instructions	70%
playability	70%
graphics	70%
value for money	60%

★ ★ ★

Must be won:

15 Spectrums plus £2,500 in software

Home Computing Weekly will always bring you the best competitions — with the biggest prizes.

We've got 15 computers and £2,500-worth of software to give away in our first £6,200 competition. It's free, easy to enter and spread over our first three issues.

We have got together with Sinclair Research — makers of the best-selling micros — and leading software house Quicksilva.

And this is what must be won:

★ Fifteen, yes that's 15, 48K ZX Spectrums, each with a printer and three programs from Sinclair's range. Each of these prize packages is worth £250.

★ Software worth £2,500 from Quicksilva. Choose from a range of 39 programs for the Spectrum, VIC-20 ZX81, BBC, Dragon and Atari. We are dividing this into 100 vouchers of £25 each.

And all you have to do is answer the questions in the coupon below and the coupons in the next two issues of Home Computing Weekly.

When you have answered the questions in this week's coupon keep it in a safe place. There will be more questions next week and a third set in issue No. 3 together with details on how to send in your three coupons.

Do not send anything to us now. Entries will only be accepted if they contain all three coupons (not copies).

This competition is not open to the staff of Home Computing Weekly, Argus Specialist Publications, Alabaster Passmore, Sinclair Research and Quicksilva. The editor's decision is final and no correspondence will be entered into.

Entry coupon No. 1 — must accompany coupons in issues 2 and 3

1 What does PMG stand for? .....

2 HMS what? .....

3 What is A(505)? .....

.....

4 What does *FX 11, 14 do? .....

.....

5 Who runs the ZX Microfair? .....

6 How many stars for Ship of Doom? .....

7 How many questions in Junior Mathematician? ....

8 Buck . . . What's his surname? .....

There will be space for your name and address on the third coupon

They couldn't believe our figures, say software men

Imagine a software company that expects to sell £2.6m-worth of arcade games in its first year. Paul Liptrot visited Imagine in Liverpool

In Liverpool, where the TV catchphrase 'giz a job' has real meaning, there's a software company whose accountant could hardly believe the scale of the business.

And Imagine Software is just six people — plus two part-time secretaries — in a suite of city centre offices.

It all began when Dave Lawson walked into the Liverpool branch of Laskys to buy a Sharp MZ80B micro. Behind the counter was sales manager Mark Butler.

They got talking and the result was that in July last year Dave left nearby Bug Byte, where he was software manager, and five months later Mark joined him to set up Imagine.

Dave, who taught himself programming on a 1K RAM Nascom, said: 'We wanted to do things our own way. I wrote a couple of games at home, VIC Arcadia and Spectrum Arcadia, and now we have six. We intend to bring out two a month'.

Now Imagine measures its business in figures that sound like telephone numbers.

Total copies of Spectrum Arcadia sold so far: 30,000 rising to around 400,000. Projected turnover it its first 12 months: £2.6m. Minimum first order for a new game from a retail chain: 10,000.

Mark, 23, whose wife Sylvia is one of Imagine's secretaries, said: 'Our accountant just couldn't believe it. He thought we'd end the year with about £2,000 in profits'.

And Dave, also 23, said: 'Initially our accountant was horrified. He didn't believe it was true. Normally you expect to break even — if you're lucky. We were talking of doing it in the first week and he laughed at us.

'It was the same with the bank. Even the head office didn't believe it. I gave them a cash flow statement and we exceeded it.'

Mark and Dave say they pay themselves less than their programmers and the profits are being ploughed back into the business and into new ventures.

Retail price of all Imagine's games is £5.50 and there's a lifetime guarantee with each one.

Imagine's boast is that all their products are original — none are conversions.

How do they come up with the ideas?

The answer is brainstorming sessions. Everyone gets together for five hours at a time drinking coffee, eating sandwiches and thrashing out ideas.

Mark said: 'Every time we've done it we've ended up with four or five ideas, two of which can be turned into games. We try to take real-life ideas, like Catcha Snatcha where you are a store detective and you have to spot the shoplifters and catch them before they can get out of the shop.

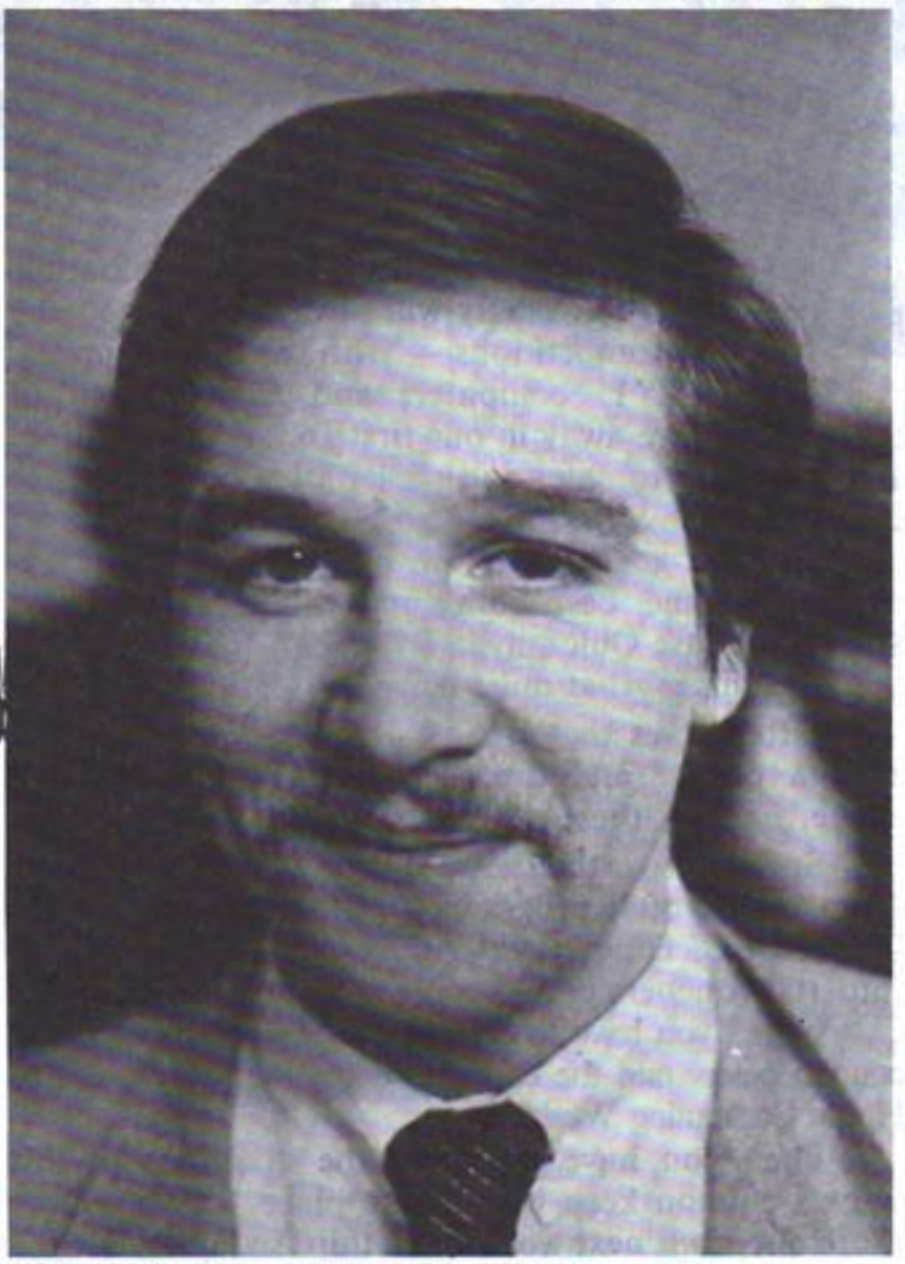
'Then there's Wacky Waiters. You are working in a restaurant and have to serve people quickly to earn tips. But if you give them too many drinks they get drunk and start making a nuisance.

'Our next two will be Frantic, a three-dimensional space game for the VIC, and Stonkers, a Spectrum tank game.'

After an idea is approved a programmer assigned to the job produces 40 to 50 screen displays on graph paper. Four or five are chosen, then he writes the storyline and why people will buy it.

Dave and Mark spend a day editing it and then programming begins — all in machine code.

About theee weeks later Dave and Mark test the game for a couple of hours and then give it to an outsider for his views.



Partners Dave Lawson (left) and Mark Butler — they met over a shop counter

More improvements are made before the final version is copied and given to five teenagers with the instruction: 'Play it all night if necessary and tell us what you think'.

When this last appraisal is over the game is presented to buyers for the big retail chains. A first order, for a chain like W.H. Smith, is usually 10,000 with another 15,000-20,000 a fortnight later. Sales will die off after nine-12 months with about ¼m in the hands of customers.

It all sounds too good to be true. And, of course, there have been tricky times.

Just before Christmas a tape duplicating company provided an order of several thousand cassettes. Imagine sent out 1,000 — and they were all returned by customers. The whole batch had been recorded at the wrong speed.

Mark said: 'We had orders for 5,000 from dealers. So we hired a duplicating house in London and did them ourselves. It took us from noon to 4pm the next day...28 hours. We didn't get a single one back. It was fantastic'.

In fact Imagine budgets for up to two per cent returns and says it strives to keep returns to a minimum. Dave and Mark say other software companies have more than five per cent sent back and some reach 15 per cent.

Programmer Eugene Evans — he wrote Wacky Waiters for the VIC-20

One returned tape had Imagine programmer Eugene Evans, 16, really puzzled.

Mark said: 'It just wouldn't load and he couldn't work it out, until he played it back like an audio cassette through the speaker. It turned out to be a Hans Christian Anderson fairy tale. We still don't know how it happened, but it must have been a mix-up at the duplicating company. We had another one back which had music by Beethoven on it.

'Eventually we will be duplicating our own tapes.'

Mark believes the market for computer software is maturing fast: 'It's going to get more and more like the record market — there will even be a Top 10 software chart.

'By the end of the year there will be five or six software houses left. And we'll be one of them. The rest will disappear or amalgamate with the bigger ones.

'There are just not enough people doing original software and I think there will be more court cases which will drive the copiers out of business.

'Big companies are approaching us offering to market our tapes but, of course, we won't sign up with them. We will always market under our own name.

"I don't think our ideas for new games will ever dry up, especially as we employ young people. They haven't got the experience of age and they don't know what they can't do. They can think of something really stupid and we turn it into a game. To them nothing is impossible.'

Keeping staff can be a problem for software companies, particularly when a programmer has a few top-selling programs to his credit. Imagine's programmers are paid £15,000 to £30,000 a year.

And that's not all. Good work is rewarded with cash bonuses, or goods such as stereo systems. In return Imagine have got programmers who have to be turfed out of the offices at 6pm — only to carry on coding at home — and who have imposed a no drinking rule on themselves.

But there are times when that rule is comprehensively broken. When a new game is finished they all go off to a night club and stay until the early hours.

Mark said: 'If we pay well they'll deliver the goods and they won't leave and set up on their own. They are all very loyal. And we don't come over as bosses. We are prepared to roll up our sleeves and go to work'.

Imagine is a partnership with Mark looking after sales — and travelling about 1,500 miles a week — and Dave supervising programming. Junior parner Steve Blower heads the Imagine-owned Studio Sting in the same offices which produces all the art- ▶

Programmer John Gibson — he and the others get fan mail

work, including cassette inlays and advertisements, as well as work for outside clients.

Apart from Eugene, also ex-Bug Byte, the programmers are John Gibson, 34, and trainee Philip Dawson. Mike Abrams, 16, handles sales and the other part-time secretary is Diana Willetts.

There are also four freelance programmers and Imagine has about 20 people on its books it can call on to help out for a few days.

What will the future bring?

In the short term there are games to come for more micros — the Oric-1 and probably the Commodore 64, BBC and Atari. Later there could be cartridges as well as cassettes.

About 60 per cent of Imagine's software is at present sold through dealers and the rest is mail order. Mark expects this percentage to increase: 'Eventually mail order will die out because dealers can provide a better service. You can look at what you're buying'.

Exports are expected to increase from the 15 per cent which now goes to countries like America, Australia and to Europe. An office in America is on the cards, especially now the Spectrum is being launched there.

By October Imagine will be a limited company and may well go public eventually.

Imagine has just signed a deal for a dockside warehouse to handle its mail orders and this side of the business could be hived off into a separate company.

Some of Imagine's games — the aim is to reflect real life

Mark and Dave have about six other projects, all connected with computers, in mind.

Dave said: 'We are starting up other businesses and providing jobs. We always buy our equipment locally as well. We probably kept two or three people in work for a year just by buying our furniture in Liverpool.

'We are ploughing everything back in for the customer's benefit. We want to be in a position where we can spend up to a year on a program.'

Mark reckons the number of staff will never exceed 25 — 'more than that and it would start getting less efficient'.

SOFTWARE FROM ASP

SPECTRUM ZAP 16K

Don't let the aliens beat you in this game of death and destruction. If you've got 16K Spectrum then this is a game you must not miss. The object is to protect yourself from the murderous onslaught of an evil enemy force, using your laser to obliterate the racy rascals.

Spectrum Zap makes good use of the computer's colour and graphics facilities and will provide you with hours of exasperating entertainment. People who have played this game swear that the difficulty level is high and although written Basic report that the action is suitably fast and furious.

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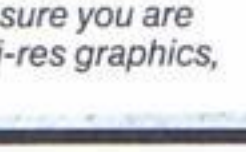

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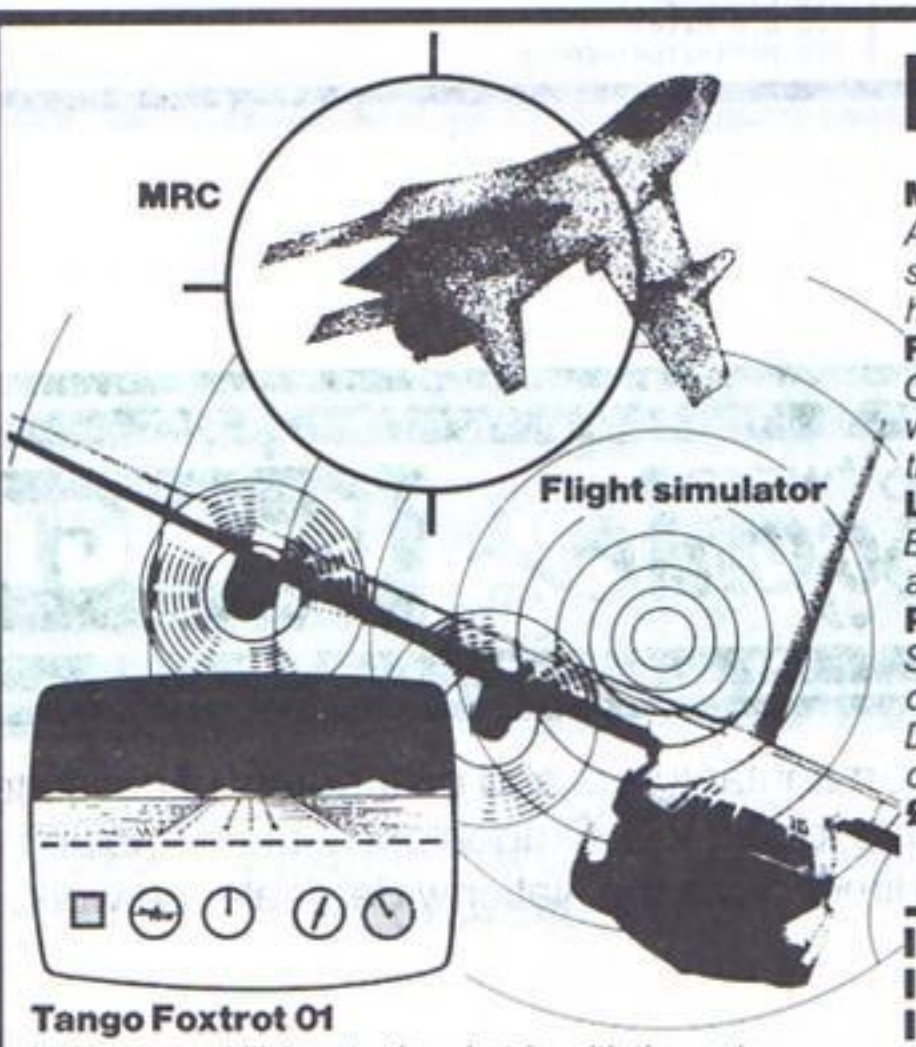

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Put some fun into maths

Is your youngster having trouble with numbers? Try David Nowotnik's program for the Oric-1 — it makes maths fun

Unless someone comes along with an easier way of learning, the elementary principles of arithmetic can only be mastered by repetitious practice — doing sum after sum, gradually increasing the level of difficulty.

For the young child, this usually means spending many hours with pencil and paper, with a patient teacher ever present to mark the results and correct the errors.

With microcomputers making an impact in primary schools, there is now the possibility for some of that load to be taken off the teacher. The microcomputer can tirelessly provide example after example for the child, checking results, correcting where necessary. And for the child, well, having things happen on a TV screen under his/her control can be far more interesting than working with old-fashioned paper and pencil.

With the explosive growth of home computers, this educational application of micros is no longer restricted to the classroom.

Junior Mathematician is a program for the Oric-1 which provides tests in addition, subtraction, multiplication, and division, for the class or for homework.

RUN the program, and you will get a page of instructions. At the bottom of this page is a menu. This provides the opportunity to select a test on one of the four arithmetic operations. Having made your selection, you will be asked to select the level of difficulty (1-4). The test then begins.

The child is presented with 10 questions (one at a time) on the chosen operation. Numbers are selected at random, so the test can be repeated many times, each with a different selection of questions.

The child should respond by entering his/her answer (and press return). If correct, the child is rewarded with a message on the screen and a audible ping. With an incorrect answer, a zap can be heard. The child gets two chances to get it right; if neither is right then the correct answer is shown.

Three points are awarded for a correct response at the first attempt; one if correct the second time. Total points are shown at the end (and expressed as a percentage).

Press a key, and the instruction page re-appears, ready to begin all over again.

```
10 REM          Junior Mathematician
20 REM            By David Nowotnik
30 REM              January, 1983
40 REM
50 REM    Initialise
60 REM
70 DIM A(4,8)
80 FORI=1TO4:FORJ=1TO8
90 READX:A(I,J)=X
100 NEXTJ:NEXTI
110 DATA0,5,0,10,0,49,0,99
120 DATA0,5,0,10,0,49,0,99
130 DATA4,10,6,10,10,10,100,100
140 DATA3,4,5,5,9,9,20,25
150 D$=CHR$(10)+CHR$(10)
160 U$=CHR$(11)
170 DIM N$(4)
180 FORI=1TO4:READZ$
```

ORIC PROGRAM

```
190 N$(I)=Z$:NEXTI
200 DATAAddition,Subtraction
210 DATAMultiplication,Division
220 GOTO500
300 REM
310 REM Subroutines
320 REM
330 PRINTU$;U$;U$;U$;:RETURN
340 FORI=1TO4:PRINTCHR$(14):NEXTI
350 RETURN
360 IFK<10THENPRINT" ";K;"  ";:RETURN
370 PRINTK;"  ";:RETURN
400 PRINTU$;:GOSUB460:PRINTRES
410 PRINTSPC(28);U$;"Correct"
420 PING:RETURN
460 PRINT:PRINTU$;CHR$(14);
470 ONZGOSUB2040,3040,4040,5040
480 RETURN
500 REM  Main Routine
510 REM
520 TEXT
530 CLS:INK4:PAPER3
540 PRINTD$;SPC(12);"Junior Mathematician"
550 PRINTD$;"   Instructions";D$
560 PRINT"This program tests your abilities"
570 PRINT"in mathematics. You are set ten"
580 PRINT"questions in either addition"
590 PRINT"subtraction, multiplication, or"
600 PRINT"division. You can select one of four"
610 PRINT"levels of difficulty. You get three"
620 PRINT"points if you get the answer right"
630 PRINT"at the first attempt, and one point"
640 PRINT"if you get it right at the second"
650 PRINT"attempt. Your final score (maximum 30)"
660 PRINT"is shown at the end."
670 PRINT:PRINT"    SELECT: ":PRINT
680 FORI=1TO4:PRINT"   ";I;".   ";N$(I)
690 NEXTI
700 GETZ$:Z=VAL(Z$):IFZ<1ORZ>4THEN700
720 GOSUB330:GOSUB340:GOSUB330
730 PRINT"   ";N$(Z):PRINT
740 PRINT"   Level 1-4?"
750 GETZ$:Y=VAL(Z$):IFY<1ORY>4THEN750
760 CLS
770 PRINTSPC(8);"Junior Mathematician"
780 MIN=A(Z,2*Y-1)
790 MAX=A(Z,2*Y)
800 PRINTN$(Z);"   Level ";Y;D$
810 SC=0
820 FORK=1TO10
830 ONZGOSUB2000,3000,4000,5000
850 MK=3
860 INPUTC:IFC=RESTHENGOSUB400:GOTO920
880 PRINTSPC(30);U$;"ERROR";:ZAP
890 FORH=1TO500:NEXTH
900 GOSUB460:MK=MK-2:IFMK>0THEN860
910 MK=0:PRINTCHR$(8);CHR$(8);"Answer ";RES
920 PRINT:SC=SC+MK
930 NEXTK
940 PRINT"    Mark= ";SC;"   (";INT(100*SC/30+.5);"%)"
950 GETZ$
960 RUN
2000 REM   Addition Subroutine
2010 O=INT(MAX*RND(1))
2020 T=INT(MAX*RND(1))
2030 RES=O+T
2040 GOSUB360
2050 PRINTO;" + ";T;" = ";
2060 RETURN
3000 REM   Subtraction Subroutine
3010 O=INT(MAX*RND(1))
3020 T=INT(MAX*RND(1))
3030 RES=O-T:IFRES<0THEN3010
3040 GOSUB340
3050 PRINTO;" - ";T;" = ";
3060 RETURN
4000 REM   Multiplication Subroutine
4010 O=INT(MIN*RND(1))
4020 T=INT(MAX*RND(1))
4030 RES=O*T:IFRES>999THEN4010
4040 GOSUB360
4050 PRINTO;" x ";T;" = ";
4060 RETURN
5000 REM   Division Subroutine
5010 T=INT(MIN*RND(1))+1
5020 RES=INT(MAX*RND(1))
5030 O=RES*T
5040 GOSUB360
5050 PRINTO;" / ";T;" = ";
5060 RETURN
```


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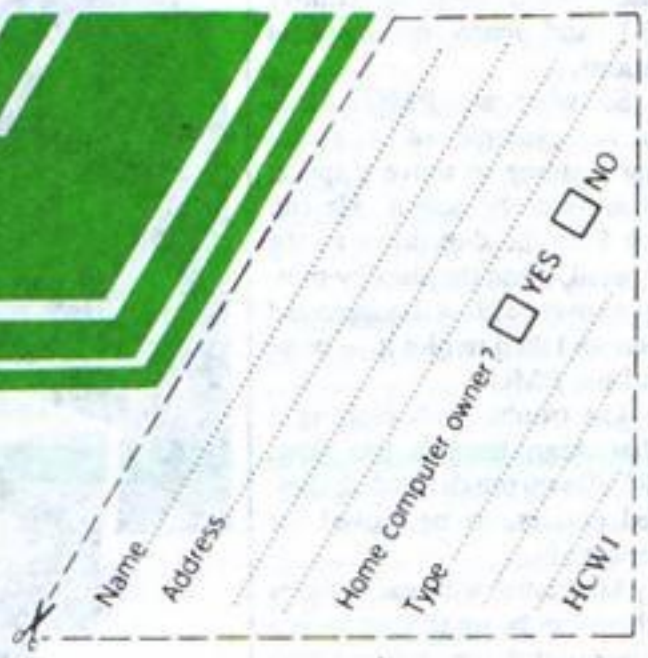

Revealed... Atari's secret graphics

Hidden features lurk inside your Atari micro, just waiting to be put to work. Your graphics guide is Marc Freebury

Atari does a tremendous job — of hiding all the most interesting and useful features of its computers.

Nowhere in any manual that comes with your Atari will you see a single sentence mentioning plyaer missile graphics, or PMG.

How does anyone know about them? The answer is De Re Atari, a book which seems a trifle expensive at £17 but is worth the money. The most valuable thing about the book is that it contains a reference card with all the addresses you'll need to control PMG, and many other useful locations.

So what are PMG? Let's take an example of a games writer wanting to move a spaceship around the screen. He can either Plot the ship down to the last detail, erase the ship by plotting it over with a background colour and then re-plot it — or he could use PMG.

The trouble with plotting it is that Atari Basic is too slow. PMG allows pre-defined shapes, called players, to be moved far more simply.

Associated with each player — there can be up to four — is a missile, useful for drawing thin lines such as bullets. We shall use the PMG to create the games writer's spaceship. First we must design our player, as in my illustration.

Each player can be as tall as as the screen, but only eight columns wide. This limits their usefulness, but if better resolution is required the players can always be placed side by side.

After designing our player we calculate the row totals using the bit values across the top. Now we must set up our program.

First we need an area to store all the information about the players. The best place is just in front of the memory used for the screen.

Screen memory is located at the top of available memory and grows according to the graphics mode being used. First we find the page number of the top of memory:

```
10 MEMTOP = 106:PAGE = PEEK(MEMTOP)
```

Now we have to go back enough pages to be in front of the graphics mode we intend to use. For GRAPHICS 0, eight pages is enough.

```
20 PAGE = PAGE – 8
```

Next we inform the computer of the PMG page number by:

```
30 PMBASE = 54279:POKE PMBASE, PAGE
```

For our own reference we want the true address, not the page number:

```
40 MYPMBASE = PAGE *256
```

Next we define the vertical resolution. This is whether the

player will occupy two horizontal lines per player line or one A one to one correspondence will give a better vertical resolution for the player, but requires twice as much PM memory to be reserved. Single line resolution (one to one) is called by:

```
50 SDMCTL=559:POKE
SDMCTL,62
```

We will use double line resolution. To call it, we use

```
50 SDMCTL=559:POKE
SDMCTL,46
```

Now we actually enable PMG with

```
60 GRACTL=53277:POKE
GRACTL,3
```

The rest all depends upon what we want to do. For a start, we usually clear any rubbish out of the PM memory we are about to use:

```
70 FOR I=MYPMBASE+512
TO MYPMBASE+639
80 POKE I,0
90 NEXT I
```

Now we set up some constants, and variables, such as position of the player (X horizontal, Y vertical).

```
100 X=100: Y=50
```

Each player's horizontal position on screen is determined by a register. One poke moves the entire player left to right. The vertical position will depend upon how far down the PM memory our player is. So we now set the player up on screen:

```
110 HPOSP0=53248:POKE
HPOSPO,X
120 FOR I=MYPMBASE+512
+Y TO MYPMBASE+519+Y
130 READ A:POKE I,A
140 NEXT I
150 DATA 60,60,126,66,195,
129,129,129
```

Now our player is on screen. Where? Well, as yet it has not been given a colour. So, we calculate a colour number for the colour register, in the form 16*luminance+colour.

```
160 PCOLR0=704:POKE
PCOLR0,175
```

Hey presto, it appears. Width is also at our control to a slight degree:

```
170 SIZEP0=53256:POKE
SIZEP0,3
```

You now have a fully controllable player. To demonstrate this control add the following lines of Basic to allow the player to be moved by a joystick in the left hand port.

```
180 A=STICK(0)
190 IF A=11 THEN X=X-1:
POKE HPOSP0,X:GOTO 180
200 IF A=7 THEN X=X+1:
POKE HPOSP0,X:GOTO 180
210 IF A <> 13 THEN 260
220 FOR I=MYPMBASE+512
+Y+9 TO MYPMBASE+512
+Y STEP -1
230 POKE I,PEEK(I-1)
240 NEXT I
250 Y=Y+1:GOTO 180
260 IF A <> 14 THEN 180
270 FOR I=MYPMBASE+511
+Y TO MYPMBASE+511+Y
+9
280 POKE I,PEEK(I+1)
290 NEXT I
300 Y=Y-1:GOTO 180
```

If you own or have played Star Raiders, you might perhaps realise that the Zylon ships are players. You will also notice that they move considerably faster than our ship. There is no easy, comprehensive answer to this.

To obtain speed in Atari Basic we often have to resort to machine code routines, and vertical movement of a player is a definite candidate for speeding up. The following machine code routines do just that. First, delete lines 210 to 300, then make the following alterations and additions:

```
2 FOR I=1536 TO 1575:READ
A:POKE I,A:NEXT I
4 DATA 104, 104, 133, 95, 104,
133, 94, 160, 1, 177, 94, 136, 145,
94, 200, 200, 192, 127, 208, 245,
96
6 DATA 104, 104, 133, 95, 104,
133, 94, 160, 127, 177, 94, 200,
145, 94, 136, 136, 208, 247, 96
8 UP=1536:DOWN=1557
210 IF A=13 THEN A=USR
(DOWN,PLAYER0):Y=Y+1
220 IF A=14 THEN A=USR
(UP,PLAYER0):Y=Y-1
230 GOTO 180
100 X=100:Y=50:PLAYER0=
MYPMBASE+512
```

PLAYER0 is a constant, pointing to the beginning of PM memory for this player. If more than one player is used, or you use single line vertical resolution, the number of constants and their values will alter.

Each player has the capability to detect a collision (ie an overlap) with anything else on the screen, and tell you whether it was another player, a screen drawing or whatever. As an illustration, make these modifications to our program.

```
190 IF A=11 THEN X=X-1
:POKE HPOSP0,X
200 IF A=7 THEN X=X+1
:POKE HPOSP0,X
92 HITCLR=53278:P0PF=
53252
94 POSITION 15, 15:PRINT "I"
230 A=PEEK(P0PF) : IF A=0
THEN POKE PCOLR0,175
240 IF A <> THEN POKE
PCOLR0,88
250 GOTO 180
```

128	64	32	16	8	4	2	1	
								60
								60
								126
								66
								195
								129
								129
								129

Designing a player — each can be as tall as the screen, but only eight columns wide

```
180 A=STICK(0) :POKE
HITCLR,0
1 GRAPHICS 0:SETCOLOR
2,0,0
```

As the collision is detected, the player changes colour. Each player and missile has several registers which tell you what collisions are currently active.

In this case, a collision is occurring between Player 0 and the Playfield, or screen. HITCLR simply clears all collisions from the registers when poked with any value. The reason for the flicker when the player stops on top of the 'I' is, I believe, that collision detection is not immediate, so only some of the collisions are being detected when the computer is not doing anything, and is looping more rapidly.

Two other features are missiles and priority, which I shall only mention.

Missiles are treated like players. They have their own horizontal position registers, and their own PM memory. As each is only two columns wide, all four fit neatly into one area the size of a player. As you have more than one entity per byte however, this makes individual missiles difficult. The other missiles must be masked out.

Lastly, priority. It is possible to set various combinations of priority, so that players, playfields and screen-drawings pass over or under one another, thus creating a three-dimensional effect. The location to use for this is GPRIOR, address 623.

Obviously PMG will be of immense use to Atari games writers, but what is really needed is for a system of machine-code routines to be written that automatically handle all PMG during a vertical blank period.

This is known as a Vertical Blank Interrupt and would handle joystick interpretation, compulsory player movement and blocking of illegal movement all in one. Such a routine exists and has been published before now.

What we really need is for a documented explanation of how to handle VBIs ourselves. Thus we come full circle, to the abominable Atari manuals. De Re Atari does include some information on VBIs, but again it is too little to help the non-technician. The only way up in this area seems to be by personal experience.

So best of luck with your PMG. ■

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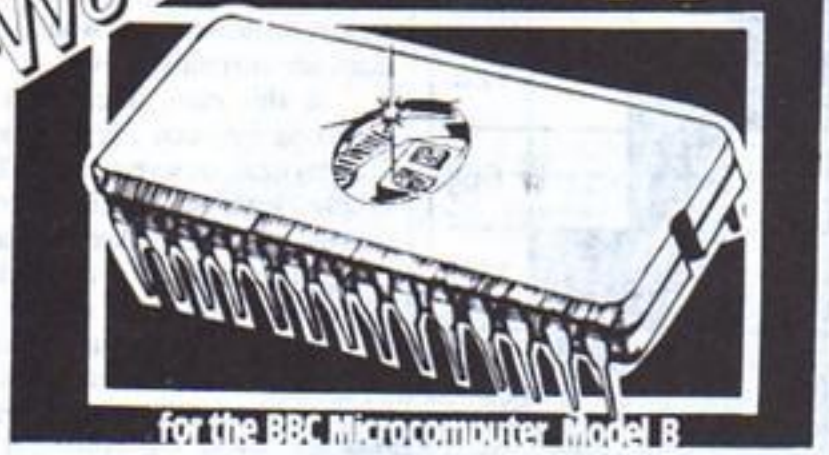

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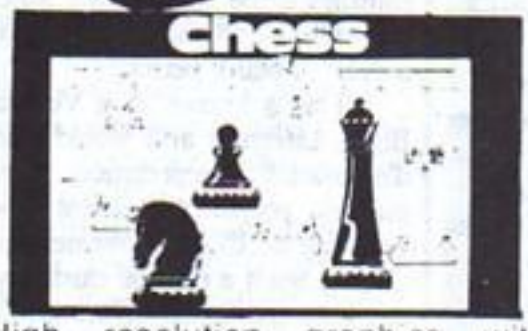

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BARCLAYCARD VISA

Next week hasn't arrived

I would like to express my dissatisfaction in Oric Products International. I ordered a 16K Oric-1 computer three months ago. Still there is no sign of it.

I have sent several letters to Oric and have received no reply. Phone calls have resulted in various excuses and delays. It will always be delivered 'next week'.

Being a newcomer to computers, you can imagine how eager I am to use my own micro for programming.

I have now purchased a VIC-20 and find it to be a very good micro for my purposes. When the Oric-1 does finally arrive I will send it back.

I hope you will print this letter to warn any potential Oric buyers that Peter Harding is suffering from the Uncle Clive syndrome of delivery delays.

C. Luke, Buckley, Clwyd.

Oric's managing director, John Tullis, told Home Computing Weekly: As you know, we have experienced production delays due to the late arrival of components.

Customers who have ordered 16K machines are being sent 48K models on a loan basis until the 16K models are available. Then the machines may simply be exchanged or the customer will have the option of buying the 48K model at a reduced price.

However, we are very surprised that Mr Luke's letters have not been answered and we are looking into this. Mr Luke has now been sent a refund.

Where's the software?

In October last year I spotted an advert for some software for the ZX81 and decided to order it. The company in question was sent my cheque for £22 in return for which they were to send me a cassette with six games and a personal and business budget program.

My order, along with the cheque, was sent to Control Technology, of Hyde, Cheshire, on September 30. The cheque was cashed by the company on October 11, but as yet I have not received my order.

Since then I have written to them on two occasions — December 5 and January 11 — but they have not replied. I would very much appreciate it if you could give this matter some attention.

Sean Hastings, Derry, Northern Ireland

A spokesman for Control Technology told Home Computing Weekly: Our records show that Mr Hastings has been sent his programs three times — on October 5, in early December and February 1. The last two were sent following his letters. We have not had them returned by the Post Office, so we naturally believed he had received them.

We pride ourselves on producing the best value programs to our customers in the shortest time possible. We sent out Mr Hastings' software within six days of getting his order.

If he contacts us we will see if we can help further.

We deal with thousands of orders each week — including exports — and this is one of the very few occasions when someone has experienced difficulty.

Letters from our sister publication, Personal Computing Today. Send yours to: Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Queries cannnot be answered on this page

Baffled? You will be

After years of bafflement, disbelief and shock, my recent excursion into computing has shown me an underlying fault with the modern world. It is computer backward maths, or C.B.M. for short, and it works like this:

A equals A minus B, so if A equals anything and B equals something, then anything minus something equals anything less.

This is proved in the following equations:

3583 equals 5K.

29000 equals 64K.

A 100 per cent price increase equals five per cent inflation.

A struggle to make ends meet equals a rise in living standards.

A simple repair for a customer equals a major overhaul which will cost a fortune.

This formula is continued world-wide. Thus a zero nuclear option equals a one-sided agreement. The whole British Navy sunk equals no losses reported.

No wonder our standing in the world has fallen. The world leaders should have knocked at 6¾ Downing Street, not No. 10 as advertised.

This system appears to have grown with the rapid rise in computers, because there is a similar rise in ludicrous claims. But even with its faults it is still an improvement on the old system of think of a number, multiply it by three and add some for luck. With this system everybody can be right no matter what they say.

Anyway, I'll carry on with my VIC-17⅓ and I will leave you to find a place for this important discovery. Oh no, not the waste paper basket...please, not that.

N. J. Carter, Edmonton

RAF group takes off

In early 1982, a few RAF computer enthusiasts floated the idea of forming a Royal Air Force Computer Association (RAFCA).

The response was staggering. Not only did many individuals come forward, but it was discovered that nearly 40 RAF stations already had Computer Clubs of their own.

There is no doubt that many RAF personnel are keeping well abreast of the latest developments in personal microcomputer technology, and there is a clear need to assist, support and represent this growing band of enthusiasts. To this end, an executive committee of the embryo RAF Computer Association has been formed and RAFCA is getting off the ground.

The primary objectives of the association are to encourage and to foster an interest in computing, thereby improving the general level of understanding of applied computer technology to the benefit of the individual and the RAF.

There is no connection with official government computing, so the objectives only relate to personal recreational computing. The RAFCA hopes to achieve its aims through presentations, demonstrations, the promotion of competitions and facilities for the exchange of information, ideas and software.

The vehicle for much of this information flow will be the RAFCA magazine Computair and its supporting broadsheet, both to be published regularly. RAFCA is seeking advertising support for the magazine, and any offers of advertising, help and discounts from commercial organisations will be gratefully received and energetically followed-up.

The association will be launched at the inaugural general meeting and association day, to be held at RAF Newton, near Nottingham, on may 7. It is planned to mount computer and program displays with talks and a celebrity speaker.

RAF computer enthusiasts are assured that this will be a worthwhile occasion to attend, and further details will be released nearer the time.

Squadron Leader John Upham, secretary, HQ RAFSC, RAF Brampton, Huntington, Cambs.

Set fair for the fair

Your readers may like to make a note in their diaries about our club's second Computerfair which is being held in the Winter Gardens, Cleethorpes, on November 20. We had a terrific response when he held our first in December last year.

This time we will have a video theatre, exhibitors' stands and stands for our club and other computer clubs in the area.

There will be something for the whole family as well as the small business.

Grimsby Computer Club meets on alternative Mondays at St James Hall, Grimsby, and membership is £8 a year with reductions for pupils, OAPs and family membership.

I can give more details if your readers write to me.

Jenson Lee, secretary, Grimsby Computer Club, 29 Park View, Cleethorpes.

Join the action for a sub hunt

Here's a chance to fight your own sea battle. Marc Freebury briefs you on your mission

You are the commander of the submarine HMS Saracen. Your mission: sink as many enemy subs as possible.

My program will work on an Atari 400 or 800 with Basic and one joystick.

Enemy subs will cross a section of sea which is partially obscured from your view by islands. The flashing dot at the top of the screen is your torpedo destination marker.

To move it right and left, use a joystick in the left-hand socket.

```
1 DIM Z$(10)
3 DIM A$(80):FOR I=1 TO 6:READ Z$:A$((I-1)*10+1,(I-1)*10+10)=Z$:NEXT I
5 GRAPHICS 1+16:POSITION 5,10:? #6;"SUB ATTACK"
6 FOR I=0 TO 240 STEP 20:FOR J=0 TO 3:SOUND J,I,10,8:FOR K=1 TO 40:NEXT K
7 NEXT J:NEXT I:GRAPHICS 0
10 GRAPHICS 0:SETCOLOR 2,0,0:POSITION 14,0:? "SUB ATTACK"
12 ? :? :? "YOU ARE THE COMMANDER OF THE"
13 ? "SUBMARINE SARACEN.YOU HAVE BEEN GIVEN"
15 ? "THE TASK OF PREVENTING ENEMY SUBS":? "FROM CROSSING A CERTAIN AREA OF SEA.
"
16 ? "THE SUBS WILL CROSS THE SCREEN.YOU"
17 ? "MUST ANGLE YOUR SHOT BY MOVING THE"
18 ? "DESTINATION DOT AT THE TOP OF THE "
20 ? "SCREEN,AND THEN FIRING THE TORPEDO"
22 ? "USING THE FIRE BUTTON.POINTS ARE"
24 ? "AWARDED ACCORDING TO THE DIFFICULTY"
26 ? "OF THE TARGET."
30 ? :? "PRESS FIRE BUTTON ";:X=0
32 A=STRIG(0):FOR I=0 TO 3:SOUND I,X,10,4:NEXT I:X=X+20
33 IF X>240 THEN X=0
34 IF A<>0 THEN 32
70 HISCORE=0
72 FOR I=0 TO 3:SOUND I,0,0,0:NEXT I
75 SCORE=0:NOSHIPS=INT(RND(1)*10)+10:SUNK=0:SHIPC=0:CONVOY=1
80 GPRIOR=623:POKE GPRIOR,4
90 GRAPHICS 7+16:SETCOLOR 2,0,0:X=100:Y=20:COLOR 1
100 PMBASE=54279:RAMTOP=106:SDMCTL=559:GRACTL=53277:HPOSP0=53248:PCOLR0=704
110 A=PEEK(RAMTOP)-20:POKE PMBASE,A:MYPMBASE=256*A:POKE SDMCTL,46:POKE GRACTL,3
120 POKE HPOSP0,0:FOR I=MYPMBASE+512 TO MYPMBASE+640:POKE I,0:NEXT I
140 Y=95:FOR I=1 TO 3:K=INT(RND(1)*20)+30:L=INT(RND(1)*20)+30
150 FOR J=Y TO Y-20 STEP -1:PLOT 0,J:DRAWTO K,J:PLOT 159,J:DRAWTO 159-L,J
160 K=K-INT(RND(1)*5)+1:L=L-INT(RND(1)*5)+1
162 IF K<0 THEN K=0
164 IF L<0 THEN L=0
170 NEXT J
180 Y=Y-30
190 NEXT I
192 PLOT 0,0:DRAWTO 159,0:PLOT 75,95:DRAWTO 80,90:DRAWTO 85,95:DRAWTO 75,95
195 SX=80:FOR I=MYPMBASE+512 TO MYPMBASE+640:POKE I,0:NEXT I
196 XPOS=20:YPOS=INT(RND(1)*50)+40:SPEED=INT(RND(1)*4+1)/2:DIRECTION=1
197 POKE PCOLR0,88:SOUND 0,200,6,8:POKE HPOSP0,XPOS
198 START=MYPMBASE+512+YPOS:POKE START,16:POKE START+1,255
200 SHIPC=SHIPC+1:IF SHIPC=NOSHIPS+1 THEN 480
205 IF INT(RND(1)*100)>60 THEN DIRECTION=-1:XPOS=215:POKE HPOSP0,XPOS
210 A=STICK(0):COLOR 1:PLOT SX,0
220 SX=SX+(A=7)*2-(A=11)*2:SX=SX+(SX<0)*2-(SX>159)*2
230 COLOR 3:PLOT SX,0
240 IF STRIG(0)<>0 OR FLAG=1 THEN 242
241 IF FLAG=0 THEN FLAG=1:MX=80:MY=89:MD=SX:MXS=MX:MYS=MY:SOUND 1,50,4,8
242 IF FLAG=0 THEN 300
243 COLOR 0:PLOT MX,MY:MX=MX+((ABS(80-MD)*SGN(MD-80))/MYS)*2
244 MY=MY-2:IF MX-2<XPOS-42 AND MX+6>XPOS-42 AND MY+2>YPOS-15 AND MY-2<YPOS-15 T
```

Press the button to fire, but don't forget to compensate for the speed of the fleeing submarines.

If you destroy nine out of the 10 subs in the pack you will be given a new pack to challenge you. At the end of each pack a running per cent rate is given. If your success rate is less than 90 per cent the game ends.

The key to playing the game is anticipation. The kill-rate expected of players is very-high... but if it were not the game would be no fun. My highest score is around 600, at which level the computer starts giving a level of player ability as well as a comment on his performance.

Here's a block-by-block description of the program:

Lines 10-90 give instructions and initialise the variables, 100-200 initialise the player/missile graphics for the submarine, 140-195 draw the screen, 196-205 set up submarine position, speed and direction, 210-310 control player, torpedo and submarine movement, 400-420 'submarine sunk' routine, 480-492 decide if a new pack is to be allowed, 500-580 end of game analysis.

```
HEN 400
245 IF MY<0 THEN MY=0
246 LOCATE MX,MY,POS
247 IF POS=1 THEN FLAG=0:SOUND 1,0,0,0:GOTO 300
248 IF POS=0 THEN COLOR 1:PLOT MX,MY:GOTO 300
250 FLAG=0:SOUND 1,0,0,0
300 XPOS=XPOS+SPEED*DIRECTION:IF XPOS=INT(XPOS) THEN POKE HPOSP0,XPOS
305 IF XPOS>220 OR XPOS<20 THEN SOUND 0,0,0,0:POKE START,0:POKE START+1,0:GOTO 1
96
310 GOTO 210
400 SOUND 0,0,0,0:FOR I=1 TO 20:SOUND 1,230,12,8:POKE START,129:POKE START+1,66:
POKE START+2,36
405 POKE START+3,24:NEXT I
407 SOUND 1,150,8,15:FOR I=0 TO 3:POKE START+I,0:FOR J=1 TO 30:NEXT J:NEXT I
410 SOUND 1,0,0,0:POKE START,0:POKE START+1,0
420 SCORE=SCORE+SPEED*20:COLOR 0:PLOT MX,MY:FLAG=0:SUNK=SUNK+1:GOTO 196
480 IF INT((SUNK/NOSHIPS)*100)<90 THEN 500
481 SHIPC=NOSHIPS
482 GRAPHICS 0:SETCOLOR 2,0,0:FOR I=20 TO 100:SOUND 0,I,10,8:NEXT I
484 POSITION 0,7:? "PACK DESTROYED!!!!":FOR I=255 TO 0 STEP -1:SOUND 0,I,10,8:NE
XT I:CONVOY=CONVOY+1
486 POSITION 0,14:? "CONVOY NO. ";CONVOY;" SIGHTED..."
487 ? :? :? :? "PRESS FIRE BUTTON... ";
490 A=STRIG(0):IF A<>0 THEN 490
492 NOSHIPS=NOSHIPS+INT(RND(1)*10)+5:GOTO 80
500 GRAPHICS 0:SETCOLOR 2,0,0:POSITION 15,0:? "RESULTS":POSITION 15,1:? "-------
"
505 ? :? :? "Of a total pack of ";NOSHIPS;" Submarines"
510 ? :? :? "Saracen sank ";SUNK;" Sub";:IF SUNK<>1 THEN ? "s"
515 ? :? CONVOY;" Sub Pack";:IF CONVOY<>1 THEN ? "s were destroyed.":GOTO 520
517 ? " was destroyed.":?
520 ? "Total score was ";SCORE
523 POS=INT(SCORE/70)*10+1:LEVEL=0:IF POS>55 THEN LEVEL=(POS-6)*10:POS=51
525 ? :? "This rates you as a";A$(POS,POS+9);" player."
527 IF LEVEL<>0 THEN ? "CLASS ";LEVEL
530 ? :IF SCORE>HISCORE THEN ? "A NEW HIGH-SCORE!!!":HISCORE=SCORE
535 ? :? "Hi-Score is      ";HISCORE
540 ? :? :? "PRESS FIRE BUTTON TO RESTART ";:X=0
550 A=STRIG(0):SOUND 0,X,10,4:SOUND 1,(256-X),10,4
560 X=X+10:IF X>250 THEN X=0
570 IF A<>0 THEN 550
580 GOTO 72
600 DATA -POOR      , FAIR      ,n AVERAGE , GOOD      , VERY GOOD, 1st CLASS
```


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SINCLAIR USER FEBRUARY 1983

Although I'm no great football fan, I really enjoyed playing this game — excellent use is made of colour and user-defined graphics. The game is very logically put together, so that the development of strategy and tactics has a real effect. For example, one of my teams got through to the fourth round of the F.A. Cup where it was beaten by a second division side. This upset morale and meant that our promotion bid failed. Perhaps I should have given up the F.A. Cup run and held some good players back — the possibilities are endless. Brian Clough had better watch out!

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Money made easy — for a change

It will pay to change the way you count the change you need for wages. John Waterhouse uses his BBC program for work

It's pay day and you have to draw enough notes and coins from the bank to give everyone their exact wages, down to the last penny.

How do you work out how many notes and coins of each domination you're going to need? By guesswork or by laborious paperwork?

My short program prepares a coin analysis report for any number of original pay amounts entered at the keyboard.

It can be used by itself or as a PROCedure within a more complex payroll program.

It is written for both models of the BBC micro, with parallel printer interface and the 0.1 operating system, connected to an Okidata Microline 80 printer.

How it works:

60 Selects printer output to the parallel port. Using *FX 5,0 acts as a printer sink and allows the program to run without printing.

70-80 @% is a pseudo-variable which controls the output format of the print statement. &707 sets up a 7 character field width in a general format and &20207 retains the field width but in fixed format with two decimal places.

90 Dimensions the two arrays to be used for holding the numbers and totals of each denomination of coin.

100 Sets the graphics mode. If the program is used as a procedure this statement must be executed outside of the procedure. All the above lines would probably be best relocated at the start of the main program.

120 Enters the current date into the program for later printing.

140 Start of the main program loop that is carried out once for each individual amount (paypacket).

150 Prompts for and accepts input of the pay amount.

160 This line copes with the inaccuracies of computer arithmetic. I found that without this multiplier the occasional 1p would be lost from the calculation. This line also does away with the decimal point by multiplying by 100 and thus enables the following calculations to be made using integer arithmetic. (% sign indicates an integer variable).

170 Looks for a zero input and terminates the input loop at line 340.

180 Start of the calculation loop. Once round the loop for each denomination of note or coin.

190-290 Sets the variable div% to a specific value each time round the calculation loop.

300 Uses integer division (DIV) to calculate the number of coins and adds to the running total in the appropriate part of array (coin%).

310 Calculates the total value for reach type of coin.

320 Carries out integer division and uses MOD to find the remainder which then is placed into the variable pay% ready for the next time round the loop.

330 Returns to the start of the loop.

340 Waits for a zero condition to be met before terminating the input loop.

350-380 Calculates the grand total from each individual coin value, ready for printing. This serves as a check on completion as the total amount of cash required will already be known.

400 Enables the printer.

410 This code sends the following character to the printer only (in this case 27,66,and31 respectively) which are printer control codes setting 60 characters per line and 5 characters per inch, to print the heading.

420 VDU commands may be strung together without repeating the three letters VDU providing that the correct number of parameters follow the initial number. VDU1 expects only one following parameter, in this case 10 which effects a printer line feed. The last two numbers (VDU10) are the equivalent of a print statement and send a line feed to the screen only.

430 Prints out the heading and date.

440 Selects 10 characters per inch at the printer.

460 Prints out the column headings.

480-600 Prints the output table giving the number and value of each denomination of coin. The last column containing the figures required by the bank. The print format is varied between columns by altering @% and this ensures that the number of coins are printed as a whole figure and that the monetary values are given with two decimal places (pounds and pence).

610-620 Prints out the total for checking purposes.

630 Disables the printer.

To make the program more user friendly the date input section should be validated at input and if used as a procedure this could be transfered from the main program which will probably have its own date input and validated section.

The pay input should also be validated as at present a mis-hit alpha key returns a zero which may not be picked up until the end of the run. A facility to delete an erroneous entry would also be of use assuming the program is keyboard driven. More likely if used as part of a larger scheme, values would be transferred straight in at line 150 either from file or from an array.

It is also a good idea to disable the escape key as this is a little too close for comfort when making many numeric entries. A numeric key pad would also be handy!

```
10  REM Coin Analysis Procedure
20  REM John Waterhouse
30  REM      1983
40
50
60  *FX5,1
70  G=&707:F=&20207
80  @%=0
90  DIM coin%(11),total(11)
100 MODE7
110 PRINT
120 INPUT"Day "D,"Month "M,"Year "Y
130 PRINT:PRINT
140 REPEAT
150    INPUT,pay
160    pay%=pay*100.000001
170    IF pay=0 THEN 340
180    FOR I=1 TO 11
190       IF I=1 div%=5000
200       IF I=2 div%=2000
210       IF I=3 div%=1000
220       IF I=4 div%=500
230       IF I=5 div%=100
240       IF I=6 div%=50
250       IF I=7 div%=20
260       IF I=8 div%=10
270       IF I=9 div%=5
280       IF I=10 div%=2
290       IF I=11 div%=1
300       coin%(I)=coin%(I)+(pay% DIV div%)
310       total(I)=coin%(I)*div%
320       pay%=(pay% MOD div%)
330       NEXT
340    UNTILpay=0
350 FOR I=1 TO 11
360    total=total+total(I)
370    NEXT
380  total=total/100
390  CLS
400  VDU2
410  VDU1,27,1,66,1,31
420  VDU1,10,1,10,10,10
430  PRINT"COIN ANALYSIS      "!D!"."!M!"."!Y
440  VDU1,30
450  VDU1,10,1,10,10,10
460  PRINT"Denomination"!TAB(18)"Number"!TAB(33)"Amount"
470  VDU1,10,10
480  @%=0
490  PRINT"Notes  50"!TAB(21)coin%(1)!!@%=F:PRINTTAB(32)coin%(
1)*50:@%=0
500  PRINT"       20"!TAB(21)coin%(2)!!@%=F:PRINTTAB(32)coin%(
2)*20:@%=0
510  PRINT"       10"!TAB(21)coin%(3)!!@%=F:PRINTTAB(32)coin%(
3)*10:@%=0
520  PRINT"        5"!TAB(21)coin%(4)!!@%=F:PRINTTAB(32)coin%(
4)*5:@%=0
530  PRINT"        1"!TAB(21)coin%(5)!!@%=F:PRINTTAB(32)coin%(
5):@%=0
540  PRINT"Coin  50p"!TAB(21)coin%(6)!!@%=F:PRINTTAB(32)coin%(
6)*.5:@%=0
550  PRINT"      20p"!TAB(21)coin%(7)!!@%=F:PRINTTAB(32)coin%(
7)*.2:@%=0
560  PRINT"      10p"!TAB(21)coin%(8)!!@%=F:PRINTTAB(32)coin%(
8)*.1:@%=0
570  PRINT"       5p"!TAB(21)coin%(9)!!@%=F:PRINTTAB(32)coin%(
9)*.05:@%=0
580  PRINT"       2p"!TAB(21)coin%(10)!!@%=F:PRINTTAB(32)coin%
(10)*.02:@%=0
590  PRINT"       1p"!TAB(21)coin%(11)!!@%=F:PRINTTAB(32)coin%
(11)*.01
600  VDU1,10,10
610  PRINTTAB(18)"TOTAL"!
620  PRINTTAB(32)total
630  VDU3
```


ZX81 16K | SPECTRUM 16/48 | DRAGON 32 | TANDY LEVEL 2 | BBC A/B

AWARI

★ The ancient African game of logic. It takes 2 minutes to learn the rules but far longer to master the tactics.

★ Select the 'Goat-herd' level of play and it's an addictive game for children (8+) that exercises their minds – not their laser fingers.

★ Select the 'Witch-doctor' level and it's a threat to your sanity. We haven't beaten it and we wrote it!

ADVENTURE

★ Over 200 places to explore in this machine code game using advanced data compression techniques.

★ No random elements – you will need skill, cunning and a sense of humour as you explore caves, forest and castles.

★ Evade ruthless pursuers and overcome a host of obstacles.

★ Multiple word commands and single letter abbreviations!

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FANTASTIC VOYAGE (ZX81 16K ONLY)

This real-time graphics simulation set inside the human body was written by a lecturer in anatomy. You are injected into the blood stream in your miniature submarine. Navigate the arteries, veins and heart to the brain, where a blood clot must be destroyed. Features a real vascular map. You will be attacked by lymphocytes which must be destroyed using arcade game type graphics. Everything you do uses up precious energy. Three display formats – a lateral and frontal body scan plus blood vessel name, a close-up scan and a laser-sight for fighting lymphocytes.

★★ Buy both Awari and Adventure and enter the 'Foilkade Challenge' competition. Details with cassette or send SAE.

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Arcade games: we pick the winners

Our team of reviewers has been putting the latest arcade games through exhaustive tests. Here's what they have chosen for the Spectrum, BBC micro and the VIC-20

Winged Adventure Spectrum £6.95

Workforce, 140 Wilsden Avenue, Luton, Beds.

Waves of attackers scream down at you...and the more you destroy the more turn up next time.

Winged Adventure is a Spectrum version of the Galaxians-type game and has three phases in which the types of attacker change. Then you start all over again until you run out of fuel.

You have to defend yourself against circles, then bird-like creatures — who need three hits before being destroyed — and a mother ship which has to be destroyed to gain more fuel.

Your lasers and shield are controlled from the keyboard and you can also select the speed of the action.

instructions	N/A
playability	80%
graphics	60%
value for money	80%

★★★★

Myriad VIC-20 plus 3K £9.99

Rabbit Software, 380 Station Road, Harrow, Middx.

You'll have difficulty tearing yourself away from Myriad, a machine code space game which is a real test of reflexes.

There are an amazing 200 levels and the number of hazards increases as you advance through the levels. They include flying bricks, pods and reflectors where you risk having your own power turned back on you.

For every 10,000 points you get three shields — but they only last 4½ seconds. And there are random extra hazards of meteorite storms and asteroids.

An extremely fast game with excellent graphics and very challenging.

instructions	60%
playability	80%
graphics	80%
value for money	80%

★★★★

Frogger VIC-20 plus 3K £9.99

Rabbit Software, 380 Station Road, Harrow, Middx.

A familiar game in which you have to ensure that five frogs cross a motorway, a barrier and a river with safety. There are logs to cross the river, but crocodiles lie in wait.

Your reflexes have to be fast to avoid the traffic and the crocs. There are four levels of play and each time you reach a new one the number of crocodiles and the amount of traffic increases.

Keyboard controls are A for up, Z for down, L for left and : for right, but you can also use a joystick.

A game which looks easy to play and turns out to be addictive.

instructions	60%
playability	80%
graphics	80%
value for money	80%

★★★★

Cruising (on Broadway) Spectrum £4.95

Solarsoft, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

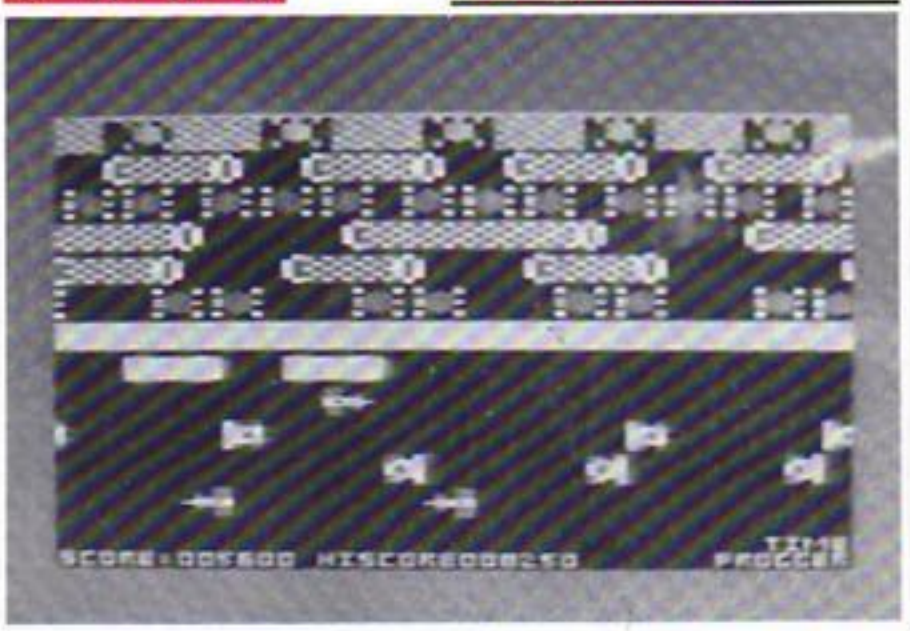
The idea of Cruising is to guide your player, a little yellow square, around four different grids as fast as possible while avoiding the computer's square which comes speeding after you. As an extra aid, you are able to interrupt the chaser's path by causing a temporary break in the grid behind you. After completion of the last grid the game returns to the beginning. Each time, one more chaser appears.

The display is adequate for a game of this simplicity and the controls are well positioned and easy to master. The instructions, however, are presented with perhaps an unnecessary display of animated titles and fanfares of weird bleeps and buzzes whereas the game is accompanied by the most modest of clicks and squeaks.

Although the game is simple it demands a high degree of dexterity and is often annoyingly fast. Beginners tend to last only a few seconds. However, with practice, it will keep people happy or frustrated for many hours.

instructions	40%
playability	60%
graphics	30%
value for money	50%

★★★★



Monsters
BBC B £9.95

Acornsoft, 4A Market Hill, Cambridge CB2 3NJ.

Sell your watch, pawn your bike... raise the money somewhere to buy this excellent arcade game. Compared with others on the market it shines out like a good deed in a bad world.

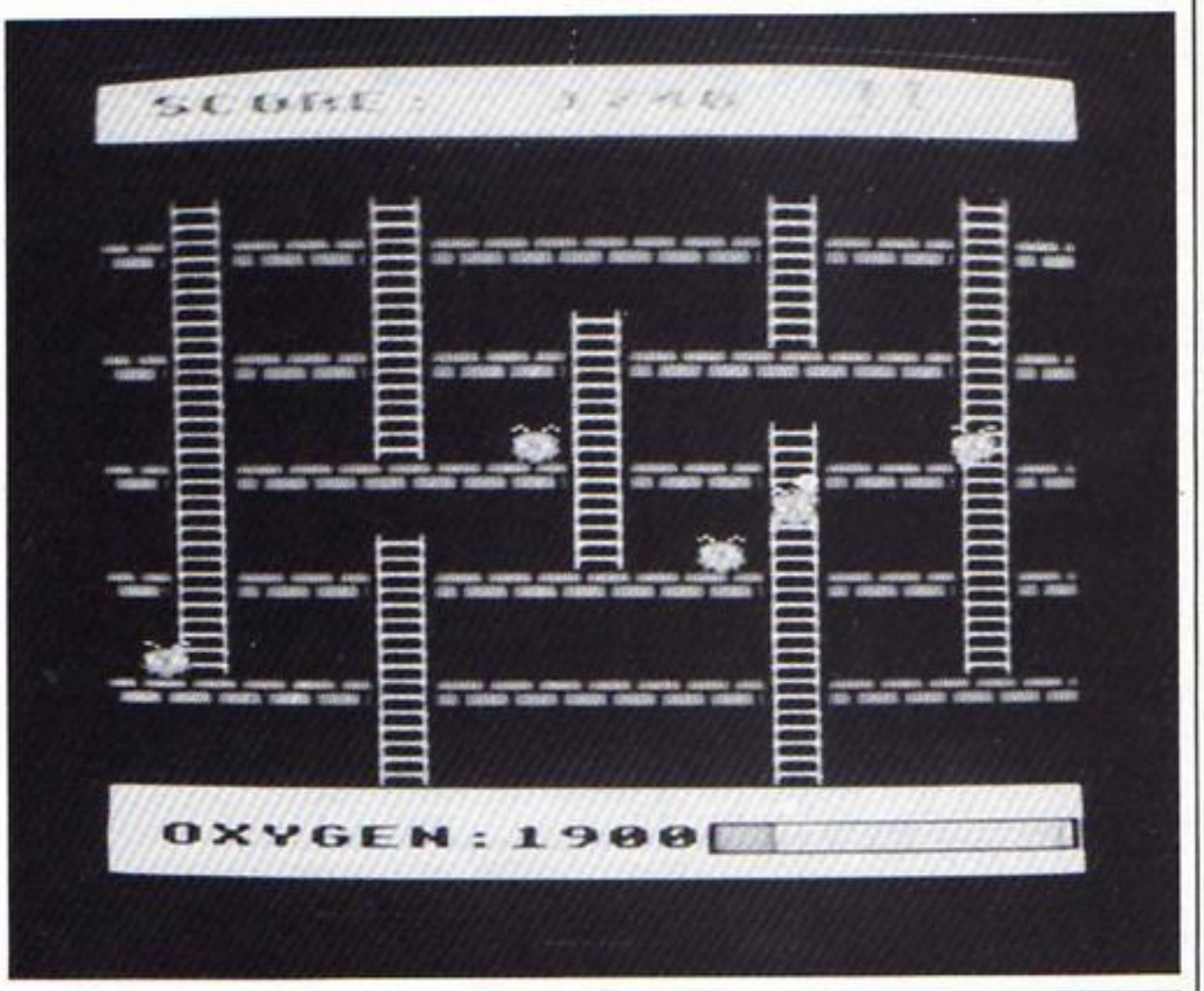
You are trapped in a labyrinth of walls and ladders with a steadily dropping supply of oxyden — and vicious monsters anxious to sink their fangs into you.

Your job is to dig holes through the walls and destroy the monsters. As the game continues there are more monsters which are even more determined...but the rewards for destroying them are greater.

There is a top 10 table so you can play tournaments.

instructions	80%
playability	90%
graphics	85%
value for money	80%

★ ★ ★ ★



Time-Gate
48K Spectrum
£6.95

Quicksilva, 92 Northam Road, Southampton SO2 0PB.

Pilot your spacecraft in four dimensions as you battle your way back in time to free the universe from aliens by destroying their planet.

In this machine code game your screen puts you in the pilot's seat so you can see the alien ships swooping towards you and indicators showing the state of your fighter.

Every so often you have to land on a friendly planet for fuel and repairs.

To reach the alien planet you have to spot random time-gates which whisk you back through time. And all the action is accompanied by 'realistic' sound effects. For more fun use a joystick.

Time-Gate comes with a program to show you how to use the keyboard controls, well-written inlay notes and a keyboard overlay.

instructions	80%
playability	90%
graphics	90%
value for money	80%

★ ★ ★ ★

Time Trek
BBC B £7.95

Program Power, 8-8A Regent Street, Chapel Allerton, Leeds LS7 4PE.

This is a long program. It's all of 21K and takes about five minutes to load. You are then given a short introduction and asked for a skill level (1 to 20). Similar to Startrek, the program is written in Mode 7 graphics and they are less than stunning.

You are at the controls of a space cruiser and your mission is to track down and destroy Klingons with phasers and photon torpedoes. You have a protective shield which can deflect some Klingon fire.

There's a battle computer to work out the energy you need to make jumps into hyperspace if the Klingons prove to be a little too troublesome. And there's a once-only panic button if you are about to be destroyed.

For a game written in Basic, it's fairly fast and quite amusing to play with many different features.

instructions	60%
playability	80%
graphics	40%
value for money	60%

★ ★ ★ ★

Star War
BBC A and B
£5.95

The Software House, 46 Oxford Street, London WC1.

A familiar invaders-style game in which you have to destroy waves of alien spaceships raining down in formation on your spacecraft.

You must move quickly — you are only given one life and the yellow attackers drop two bombs at a time, and only when you are positioned.

It is possible to achieve a fairly high score if you're nimble and take full advantage of the four protective screens. But remember, with a single life you dare not take many risks.

Keyboard controls are fairly standard: left and right arrows to move and space bar to fire.

At the price it represents good value.

instructions	60%
playability	60%
graphics	60%
value for money	80%

★ ★ ★ ★

Buck Dodgers in the 25th Century
VIC-20 £5.95

The Software House, 46 Oxford Street, London WC1.

Our Buck seems to have come down in the Universe. Instead of zapping aliens he's reduced to piloting a space bulldozer. He has to use his anti-matter shovels to clear space debris left by hitch-hikers to clear a way for inter-galatic highway No. 42.

For every load of garbage Buck collects he gets 10 zats and has to re-fuel on green Zargovian anti-matter.

Your job is to guide Buck, avoiding space junk which earns you a big fine. There's a 100 zats bonus for doing enough work to pass through one of the red star gates. But if you attack them in error you land Buck with another hefty fine.

You may find that Buck's flying dustcart suddenly disappears. That's because it's touched something dangerous... so watch out.

Good value and an amusing game.

instructions	60%
playability	70%
graphics	60%
value for money	80%

★ ★ ★ ★

Graphics to give your programs more class

If you're a VIC-20 owner yearning for better graphics, Allen Webb has some improving reading for you

One of the main criticisms levelled at the VIC-20 is the limitation of the screen size and the need for extra software for high resolution graphics.

Many VIC owners will know how simple it is to improve matters by using user-defined characters. There are, however, additional techniques by which the programmer can improve the graphics and give his programme a little more class.

First the bad news. VIC owners with less than 8K memory expansion will not be able to use these techniques properly.

Before giveing any details of these techniques, I must first discuss how the start of Basic can be raised. This will probably be unnecessary to many owners, but please be patient since it is germane to the use of the routines described.

The address of the start of Basic is held in locations 43 and 44 as two bytes. These values must be reset to the required values. In addition, the byte before the start of Basic must be zero. If the required start of Basic is SA, the following line in command mode will carry out the required action:

POKE 44,SA/256: POKE 43,SA-PEEK(44)*256: POKE SA-1,0: NEW

Don't worry if you make a mistake in the typing. Any incorrect values will simply result in a SYNTAX ERROR message and will do no damage.

Most of what comes next is covered in the CBM VIC-20 Programmer's Reference Guide. I fully recommend this book for further reading.

As most critics are willing to tell us, the normal size of the VIC screen is 23 rows of 22 characters. The actual number of rows is controlled by bits 1-6 of location 36867. Any attempts to increase the number of rows will give extra rows of odd characters at the bottom of the screen.

Any attempt to move the cursor to this new area is foiled since the operating system does not recognise this extra screen. This area is, however, contiguous with the normal screen and can be poked with characters. The colour array behaves in the same way.

Listing 1 gives a routine for the generation of a screen containing 30 rows of 22 characters.

Since the screen occupies a greater area than normal, and to provide space for user defined characters, the bottom of Basic must be raised to 6200 (decimal) or above. A short machine code routine is located at 5000 (decimal) to clear the new screen. Line 190 provides a set of standard characters in RAM and the first poke in line 110 sets the pointers to the user defined character area. For operation without user-defined characters, delete line 190 and the first poke in line 110.

Listing 2 gives a short routine which will fool the operating system into placing the print cursor at any specified row and column on the extended screen. A print statement executed after this routine will be printed at the required position. Any print statements should finish with a semi-colon to suppress scrolling of the normal screen area.

The expanded screen offers greater flexibility for programs using mainly text, like word processing and adventures, as well as providing a little more space for arcade-type games.

Most owners will be aware that during expansion, the screen memory moves from 7680 (decimal) to 4096 (decimal). This is all to do with efficient use of memory. The VIC will, however, allow up to six screen locations.

The screen position is controlled by bit 7 of location 36866 and bits 4-7 of location 36869. Location 648 contains the most significant byte of the screen start address.

The position of the screen can be changed by two methods.

- In direct mode...

POKE 648, Z followed by RETURN and RUN/STOP + RESTORE.

- In a program...

10 POKE 36866,X: POKE 36869,Y: POKE 648,Z

Listing 1

```
10 REM LARGE SCREEN SYSTEM FOR VIC-20...A E WEBB 1982
20 REM  ********************************
30 REM  *        MEMORY MAP
40 REM  * 4096-4756...SCREEN
50 REM  * 5000-5035...SCREEN CLEAR MC
60 REM  * 5120-5631...1ST 64 CHARS OF
70 REM  *              STANDARD SET
80 REM  * 5632-6144...CUSTOM CHARS
90 REM  * 6200-.......START OF BASIC
100 REM ********************************
110 POKE36869,205:POKE36864,12:POKE36866,22
120 POKE36867,188:POKE36865,24
130 FORI=0TO35:READA:POKE5000+I,A:NEXT
140 SYS5000
150 DATA162,0,169,32,157,0,16,157,208,16,157
160 DATA160,17,157,112,18,169,0,157,0,148
170 DATA157,208,148,157,160,149,157,112,150,232
180 DATA224,209,208,223,96
190 FORL=0TO511:POKE5120+L,PEEK(32768+L):NEXT
```

Listing 2

```
10 SA=4096+(ROW-1)*22+COL
20 POKE210,SA/256:POKE209,SA-PEEK(210)*256
30 POKE211,0:POKE214,ROW-1
40 RETURN
50 REM*********************************
60 REM SUBROUTINE TO POSITION THE
70 REM PRINT CURSOR ANY WHERE IN THE
80 REM ENLARGED SCREEN.
90 REM*********************************
```

Listing 3

```
10 D$(1)="*■*****■"
20 D$(2)="■*■*■*****■"
30 D$(3)="■**■*■***■"
40 D$(4)="■***■*■**■"
50 D$(5)="■****■*■*■"
60 D$(6)="■*****■*■"
70 POKE36879,25:POKE36864,16
80 DATA 16,18,24,26,28,30
90 FORL=1TO6
100 READ P1(L):NEXT
110 DATA 192,192,224,224,240,240
120 FORL=1TO6
130 READ P2(L):NEXT
140 FORL=1TO6
150 P3=22:IF(L/2)=INT(L/2)THENP3=150
160 POKE648,P1(L):POKE36866,P3:POKE36869,P2(L)
170 PRINT"□":FORJ=1TO23:FORK=1TO3:PRINTD$(L);
    :NEXTK:PRINT:NEXTJ,L
180 FORL=1TO6
190 P3=22:IF(L/2)=INT(L/2)THENP3=150
200 POKE648,P1(L):POKE36866,P3:POKE36869,P2(L)
210 FORDE=1TO200:NEXT
220 NEXT
230 GOTO180
240 REM*********************************
250 REM THE USE OF THE SIX POSSIBLE
260 REM   VIC SCREENS TO PRODUCE
270 REM      SIMPLE ANIMATION
280 REM       A E WEBB 1982
290 REM*********************************
```

Table 1

Screen position (decimal)	Colour Array position (decimal)	X	Y	Z
4096	37888	22	192	16
4608	38400	150	192	18
6144	37888	22	224	24
6656	38400	150	224	26
7168	37888	22	240	28
7680	38400	150	240	30

The values for X, Y and Z are:

In order to use all of these screens, the bottom of Basic should be raised to 8192 (decimal). Since each screen can be used independently, simple animation effects can be demonstrated. Listing 3 gives a demonstration routine. Lines 120 to 170 set up each screen in turn by performing the required pokes. Lines 180 to 230 recall each screen in sequence. Line 210 is a simple delay and can be removed to demonstrate the effects at full speed.

To use user defined characters with a relocated screen, a fair amount of bit twiddling is necessary. Listing 4 is a short program which will provide all necessary data for all screen-character set configurations.

The only way to use all of the multiple screens with user defined characters would probably be to locate the character set at 5120 (decimal). I haven't had a chance to check that yet.

User defined characters are of great value but are not really any use for direct uses such as graph plotting, sketching, drawing a man in an adventure and so on. If you have enough spare cash, a Super Expander will be a good investment. If not, and you don't mind the slow speed of basic, Listing 5 might be of value.

This routine must be used with the bottom of Basic at 8300 (decimal). A machine code routine at 8200 (decimal) sets up the screen to a 176 by 160 resolution. The routine does not trap out of range values for X and Y. You must do this.

These routines are, not unexpectedly, of a general nature. They are intended to offer useful alternatives to VIC owners and, I hope, provoke a little interest.

Since these routines are specifically created to use the VIC's particular capabilities, they cannot be converted for use on other machines.

Due to the limitations of space, it is not feasible to describe in detals how each routine works. The text gives an outline description of each. I suggest you experiment with the routines and read the book recommended earlier.

Listing 4

```
1 REM ALLEN WEBB 1982
10 DATA 4096,252,5120,253,6144,254,7168,255
20 DATA 4096,16,192,4608,18,192,6144,24,224,6656,26,224,7168,28,240,7680,30,240
30 FORL=1TO4
40 READCP(L),P1(L):NEXT
50 REM CP=CHAR POS P1=36869 POKE
60 FORL=1TO6
70 READ SP(L),P2(L),P3(L):NEXT
80 REM SP=SCREEN POS P2=648 POKE P3,36869 POKE
90 PRINT"■   VIC CONFIGURATION          ROUTINE"
100 PRINT"————————————————————"
110 PRINT"■YOU MUST HAVE AT LEAST8K EXPANSION AND PUT  THE START";
120 PRINT" OF BASIC TO $2000 TO USE ALL OF   THE COMBINATIONS OF   ADDRESSES GI
VEN."
130 PRINT"■■■ ■PRESS SPACE FOR MORE"
140 GETI$:IFI$<>" "THEN140
150 PRINT"■    SCREEN LOCATION"
160 PRINT"————————————————————"
170 PRINT"■THE SCREEN CAN BE PUT AT THE FOLLOWING      LOCATIONS."
180 PRINT"■"
190 FORL=1TO6:O$=STR$(L)+".  $"+RIGHT$(STR$(SP(L)),4)
200 PRINTO$:NEXT
210 PRINT"■■PLEASE SELECT"
220 GETI:IFI<1ORI>6THEN220
230 SP=SP(I):PA=P2(I):PB=P3(I)
240 PC=22:CA=37888:IFINT(I/2)=I/2THENPC=150:CA=38400
250 PRINT"■THE SCREEN CAN BE PUT AT $";SP;"BY:"
260 PRINT"■1. POKE648,"PA;"IN     DIRECT MODE. FOLLOWED BY RESTORE."
270 PRINT"■OR":PRINT"2. POKE648,";PA;"          POKE36869,"PB."   POKE36866,"PC
280 PRINT"IN A PROGRAM."
290 PRINT"■THE COLOUR ARRAY WILL START AT";CA
300 PRINT"■■■ ■PRESS SPACE FOR MORE"
310 GETI$:IFI$<>" "THEN310
320 PRINT"■CHARACTER SET LOCATION"
330 PRINT"■————————————————————"
340 PRINT"THE CHARACTER SET CAN BE PUT AT:"
350 PRINT"■"
360 FORL=1TO4:O$=STR$(L)+".  $"+RIGHT$(STR$(CP(L)),4)
370 PRINTO$:NEXT
380 PRINT"■■PLEASE SELECT"
390 GETI:IFI<1ORI>4THEN390
400 CP=CP(I):PD=P1(I)
410 IFCP<>SPTHEN470
420 PRINT"■THE CHARACTER SET AND SCREEN CANNOT BE AT   THE SAME ADDRESS"
430 PRINT"■DO YOU WANT TO SELECT ANOTHER ADDRESS (Y/N)?"
440 GETI$:IFI$=""THEN440
450 IFI$="Y"THEN340
460 END
470 FP=(PBAND240)OR(PDAND15)
480 PRINT"■POKE36869,"FP;"WILL   SET THE SCREEN AND    CHARACTER SET TO THE  RE
QUIRED";
490 PRINT" ADDRESSES."
```

Listing 5

```
10 IFPEEK(8200)=72ANDPEEK(8210)=169ANDPEEK(8284)
   =96THEN110
20 DATA72,152,72,138,72,169,252,141,5,144
30 DATA169,21,141,3,144,169,0,133,87,170,165
40 DATA87,157,0,30,169,6,157,0,150,230
50 DATA87,232,224,220,208,239,169,0,133,87
60 DATA169,16,133,88,162,0,160,0,169,0
70 DATA145,87,200,192,22,208,247,232,224,160
80 DATA240,16,24,165,87,105,22,133,87,165
90 DATA88,105,0,133,88,76,55,32,104,170,104,168,104,96
100 FORL=8200TO8284:READX:POKEL,X:NEXT
110 SYS8200
120 GOTO1000
130 C=INT(Y/16)*22+INT(X/8)
140 R=(Y/16-INT(Y/16))*16
150 B1=4096+C*16+R
160 B2=7-(X-INT(X/8)*8)
170 IFSF=1THENPOKEB1,PEEK(B1)OR(2↑B2)
   :POKE38400+C,CO:RETURN
180 IFSF=0THENPOKEB1,PEEK(B1)AND(255-2↑B2):RETURN
1000 REM*****************************
1010 REM MAIN PROGRAM STARTS HERE
1020 REM*****************************
1030 REM
1040 REM*****************************
1050 REM     HI-RES PLOT ROUTINE
1060 REM      X=0-175   Y=0-159
1070 REM       (A E WEBB 1982)
1080 REM
1090 REM MEMORY MAP...
1100 REM 4096-7615..CHARACTER SET
1110 REM 7680-8186..SCREEN
1120 REM 8200-8224..MACHINE CODE
1130 REM 8300.....START OF BASIC
1140 REM
1150 REM*****************************
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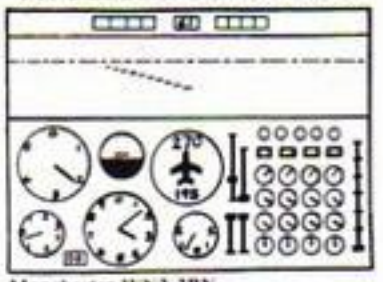

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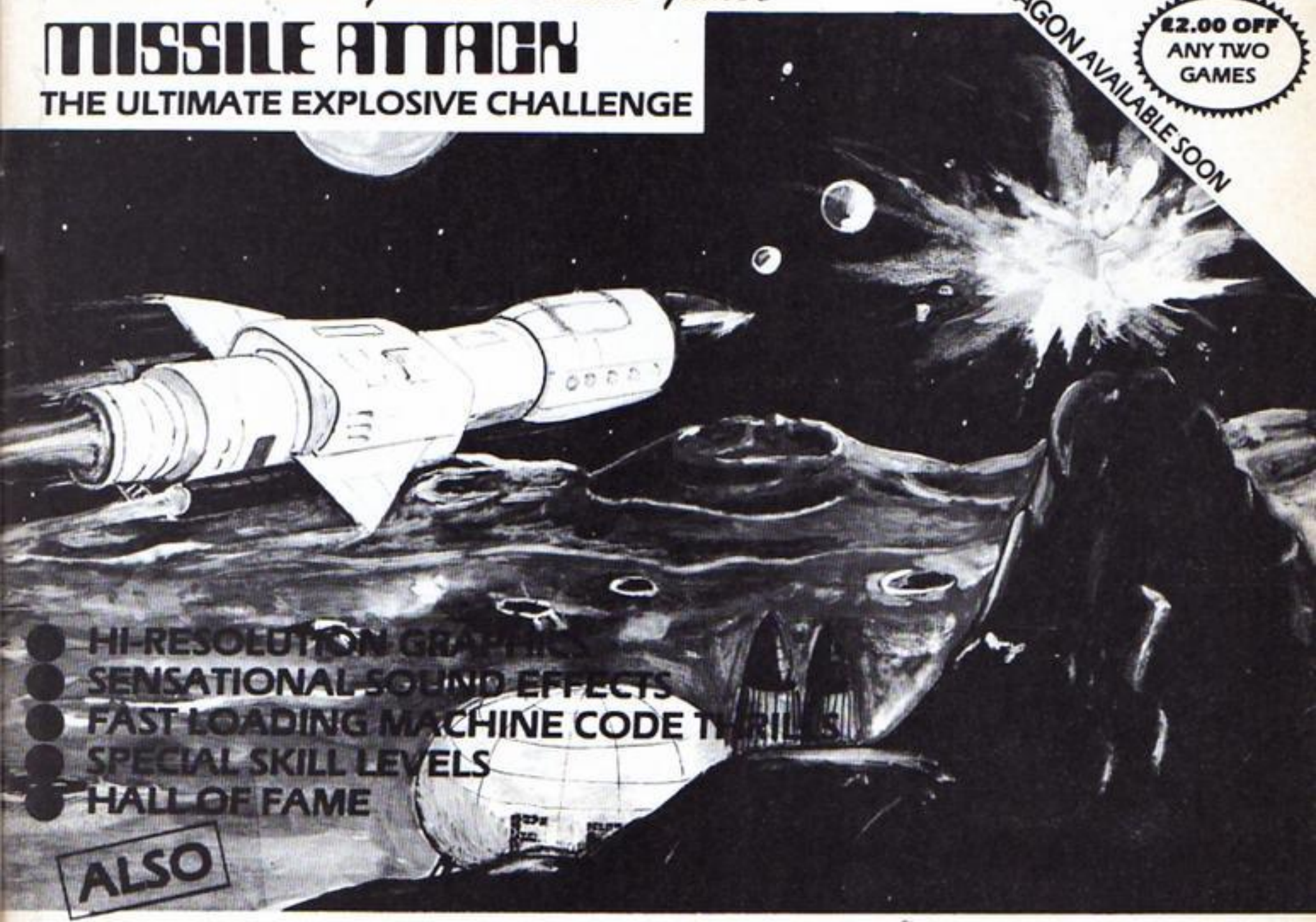

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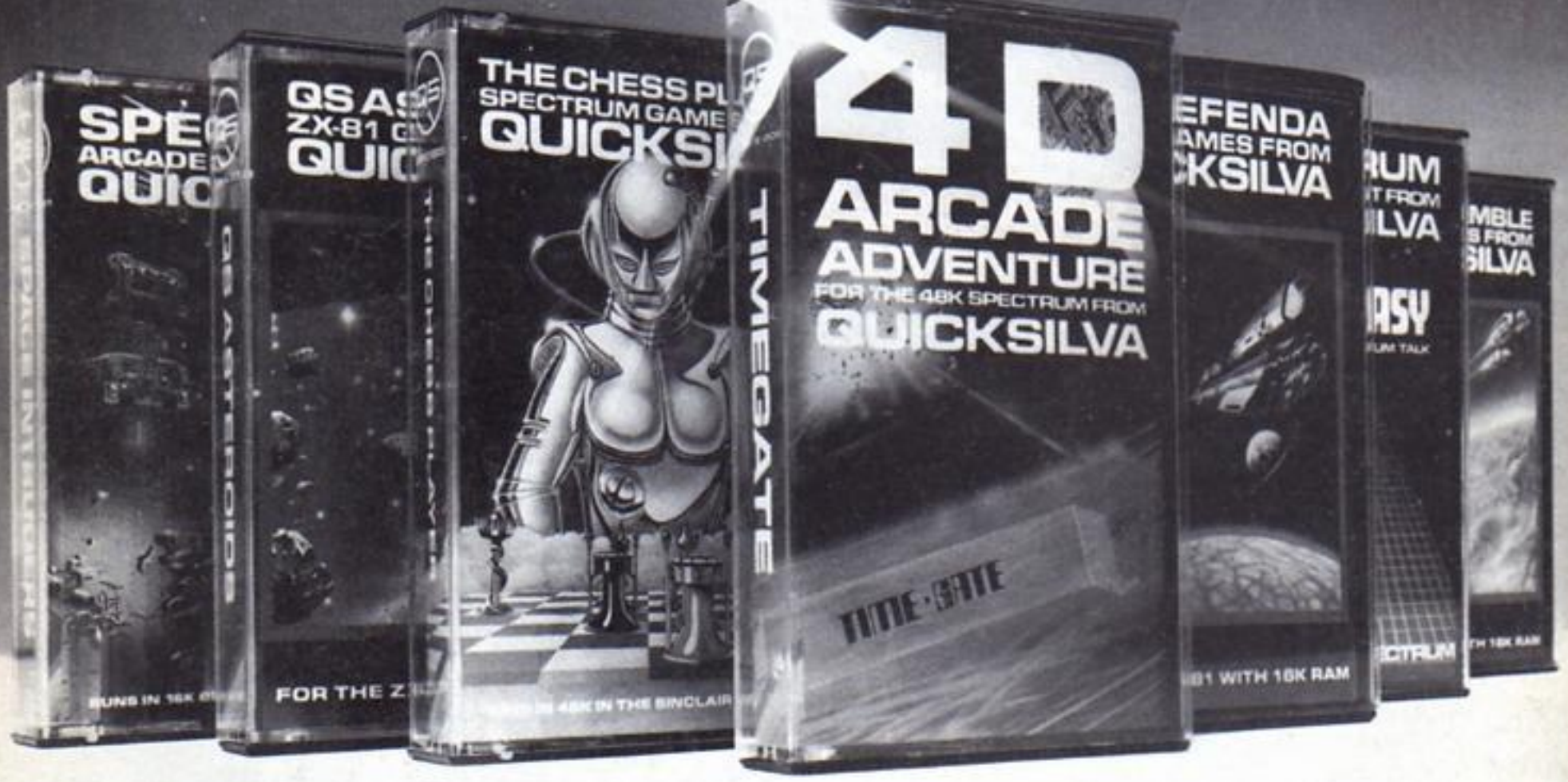

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